Math II-1

Activities

Patterns

Who Stole the Numbers?

Standard II:
Students will identify and use number patterns and properties to describe and represent mathematical relationships.

Objective 1:
Recognize, describe, and represent patterns with more than one attribute.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.

Content Connections:
Language Arts VIII-2; Writing

Math Standard II

Objective 1

Connections

Background Information

Prior to teaching this lesson, students will need to be introduced to patterns and be able to recognize patterns on the hundreds chart. Students will also need a basic knowledge of skip counting. Singing skip counting songs and having the students skip count by 2's 5's and 10's on a regular basis will be helpful before starting this lesson. It will also be helpful for students to have basic number sense and understanding of greater than and less than before beginning this activity. Helping students make connections from real world to math helps solidify these concepts. The following activity can be done multiple times with many different missing patterns and numbers.

Research Basis

Bonotto, C. June 2001. How to connect school mathematics with students' out-of-school knowledge. *ZDM*. Vol. 33. pg 75-84.

In this study supermarket receipts were used to construct new knowledge for the students. In the study, the receipts became tools of mediation and integration between in and out-of-school knowledge. They were utilized to create new mathematical goals, thus becoming real mathematizing tools and constituting an interface between in and out-of-school mathematics.

Fosnot, C.T., Dolk, M. 2001. *Young Mathematicians At Work*. ISBN 0-325-00353-X

The mind is never a blank slate. Children always attempt to understand "how many." How many plums are in the grocer's box, how many stairs did they climb, how many fish are in the tank. This uses various schemas. Teachers need to bring every day activities to classroom routines so that student's mathematics is real to life and teachers have achieved mathematizing (connecting to the world) in the classroom.

Invitation to Learn

This activity is called "Start With." Begin by writing a single digit number on the board. Underneath the number write the next number in the counting sequence as if counting by 2's, 5,s or 10's. Continue writing the correct numbers in the sequence until students notice the pattern. Discuss the pattern with the class using the hundreds chart to help with the understanding. Have students record findings in their math journals. (e.g., 3, 8, 13, 18, 23, 28, etc.)

Instructional Procedures

Materials

- ❑ Hundreds chart
- ❑ *Mini Hundreds Charts*
- ❑ Regular markers
- ❑ Transparent covers

1. Remove numbers from the hundreds chart in a pattern. (By 2's, 3's, 4's, growing, etc.) Do not remove any numbers higher than 20. This should be done while the students are out of the classroom.
2. Begin by putting an addition problem on the board and ask the students to use the hundreds chart to figure out the answer. The students will notice that there are some numbers missing from the hundreds chart. Say, "Who stole the numbers?"
3. Talk with the class about the missing numbers. This should take at least five minutes. Here are some sample questions to ask students;

   What numbers are gone?

   How do you know those are the missing ones?

   What can you tell me about the missing numbers?

   What would the pattern look like if it were to continue on the hundreds chart?
4. Give students their own *Mini Hundreds Chart* and a marker. Have each student complete the pattern by coloring the numbers that should be removed if the pattern continued. Students also color any numbers that have already been removed.
5. After students have finished coloring the *Mini Hundreds Chart,* have them identify the patterns they noticed. Discuss the different strategies that were used by students to color in the hundreds chart.
6. Lead students to discover that the pattern is skip counting.
7. Have the students help to identify the rest of the numbers in the hundreds chart following the pattern. Use transparent covers to place over the numbers.
8. Leave the transparent covers in the hundreds chart for a few days and refer to it often before moving onto a different pattern of skip counting.

Assessment Suggestions

- As the students are coloring in their hundreds chart observe strategies they are using to figure out what number to color in next. Notice if they are able to do the work independently or if they are looking to classmates and teacher for help. Make a note of any students that may be struggling.
- Allow students to share their strategies in a class meeting or discussion. Provide an opportunity for them to demonstrate their thinking. This provides students a chance to teach each other and is a great observation for you to assess their understanding.
- Students could be asked to respond to questions in their journal that would give evidence of understanding. Some possible questions are:

  -What patterns do you notice in the hundreds chart?

  -How did you discover the skip counting pattern?
- Use effective questioning to find out students' levels of understanding and to stimulate thinking.

Curriculum Extensions/Adaptations/Integration

- Take down the hundreds chart or provide a mini hundreds board with removable numbers and allow students to manipulate it to show counting by a chosen number you provide for them.
- This activity can be repeated numerous times with different patterns. Using growing patterns with this activity also works well.
- You can integrate this lesson with interactive writing by composing a class letter to "Whoever is stealing the numbers out of our room." Make sure to describe the numbers using odd, even, pattern, etc. Help students understand the different parts of a letter. Students can copy the letter in their journal for handwriting practice or compose an original letter of their own.
- Students can work in pairs if needed. Some students may need larger hundreds boards to write on. Another adaptation is to give students a 1-20 board.

Family Connections

- Send home a letter asking parents to gather 12 pennies and sit at a table with their student. The parent should then instruct

the student to divide the pennies into groups of 2, 3 then 4. Students write a three sentence summary of the activity.

- Have students notice things at home that come in 2's 3's or 4's and tell the class about it for show and tell time.
- Send home skip counting cards that students can practice at home.
- Students can compose a letter to a family member telling of the adventures in your classroom.

Additional Resources

Books

98,99,100! Ready or Not, Here I Come!, by Teddy Slater; ISBN 9780590120093
What Comes In 2's, 3's, & 4's?, by Suzanne Aker; ISBN 9780590478389
A Pair of Socks, by Stuart J. Murphy; ISBN 978059006259
Skip Count by 5, Its No Jive, by Tracy Kompelein; ISBN 9781599285436
Skip Count by 2, Now Can You, by Tracy Kompelein; ISBN 9781599285450
Skip Count by 10, Lets Do It Again, by Tracy Kompelein; ISBN 9781599285412
Ants Go Marching Two by Two, by Maria Fleming; ISBN 9780439690249
The Skip Count Song, by Rozanne Lanczak Williams; ISBN 9780916119997
Skip Counting By Twos, Threes, Fives, and Tens, by Kari Jenson Gold; ISBN 9781582731445
Reese's Pieces Count by Fives, by Jerry Pallotta, Rob Bolster; ISBN 9780439135207

Web sites

http://nlvm.usu.edu/en/nav/vlibrary.html
http://www.carlscorner.us
http://teacher.scholastic.com/maven/cafeteri/index.htm
http://teacher.scholastic.com/max/
http://www.scholastic.com/clifford/play/sortitout/noflash.htm
http://www.sitesforteachers.com
http://www.edhelper.com
http://www.teacherplanet.com
http://www.worksheets4teachers.com
http://www.abcteach.com
http://www.primarygames.com
http://www.songsforteaching.com
http://www.theteacherscorner.net
http://www.softschools.com
http://illuninations.nctm.org
http://www.ucutips.org
http://www.utips.org

Organizations

National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 20191-1502 (703) 620-9840, http://www.nctm.org

Mini Hundreds Charts

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
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The Sort of Things

Standard II:

Students will identify and use number patterns and properties to describe and represent mathematical relationships.

Objective 1:

Recognize, describe, and represent patterns with more than one attribute.

Intended Learning Outcomes:

5. Understand and use basic concepts and skills.

Content Connections:

Language Arts I-1; Develop language through listening and speaking.

Math Standard II

Objective 1

Connections

Background Information

A very important part of sorting is being able to identify different categories. Before doing this activity make sure that students have had exposure to several category recognition activities. For example use attribute blocks and discuss the many ways to describe them. Help students understand that the different attributes could be categories. As a class, select some categories and identify the attribute blocks that could fit into each category. Another idea would be to have the class sort category cards into their proper categories. You can have them make a poster of different categories and items to fit in them. This lesson allows students to discover representations of intersecting sets, and introduces them to Venn Diagrams. Effective questioning will guide students to a deeper understanding of these concepts.

Research Basis

McClure, CT. Questions can be powerful. *District Administration*. Sept 2007, p 66.

Researchers have identified effective questioning as a tool for building students' higher level thinking skills. Higher-level questions promote the development of thinking skills. Another important aspect of effective questioning is wait time before calling on a student as well as after the student responds. If this wait time is increased students usually give responses that are longer and more complex with evidence to support their ideas. Students are also more likely to ask questions, listen to others, and increase classroom participation.

Napell, SM. Using questions to enhance classroom learning. *Education*. 2001 Vol. 99 No. 2. p188.

The questions instructors ask in the classroom and the ways in which they ask them can have adverse effects on class participation

and students' learning. Learning the skills of effective questioning techniques can change students from passive classroom spectators to active, creative participants in the learning process. In this paper questions are classified and analyzed, with methods for effective questioning demonstrated.

Wragg, E.C, & Brown, G. *Questioning in the Primary School*. ISBN 0-415-24951-1

Children's own thinking and learning can be improved significantly if they have the opportunity to respond to teachers' questions and to enjoy the process of interaction with them. The principal focus of this book is on everyday questions and questioning within the classroom, whether that classroom is organized in groups, for individual learning, or for whole class activities.

Invitation to Learn

This activity is called "1-2-3 Categories." Have students sit on the floor in a large circle. Begin the game by slapping your knees twice, clapping your hands once then doing thumbs up over your shoulders once. After showing the clapping pattern explain that you are going to do the clapping as a class and everyone is going to say a word that fits the category when you do the thumbs up part. Show them an example. Have the students practice the clapping pattern. When students have the pattern and rhythm begin the chant. It goes "1-2-3 categories" the first time. The second time it is "1-2-3 colors" (or another category). The students continue around the circle naming a different color until they cannot think of any other colors to fit in that category. Discuss with the students the things they just named. What are they? Why would we name all of these things? Continue the game with a different category.

Instructional Procedures

Materials

- ❑ *Zooba Cards*
- ❑ *Sorting Labels*
- ❑ Grouping circles
- ❑ *Venn Diagram*
- ❑ Venn Diagram chart
- ❑ Math journals

Zooba Cards

1. Make the *Zooba Cards*. See black line master for instructions. One set per four students. Also make one overhead set and a matching paper set.
2. Make *Sorting Labels*. See black line master for instructions.
3. Give each group of students a set of *Zooba Cards* and two grouping circles. Next, give students two *Sorting Labels* such as (hair, no hair) for the grouping circles and have them sort the cards appropriately. Make sure that the *Zooba Cards* cannot fit in both circles.

4. Repeat this process by changing the *Sorting Labels* and making sure that one *Zooba Card* cannot fit in both circles.
5. After the students can successfully sort the cards into two categories, give students *Sorting Labels* that will require *Zooba Cards* to fit in more than one circle such as (hair, circle). Observe students as they discover the problem and try to come up with solutions.
6. As you are prompting students to make the grouping circles into Venn Diagrams ask probing questions to different groups to engage thinking. Some example questions follow:
   - Where should this one go?
   - What are you going to do about this?
   - Does this card go in this circle or this circle?
   - How can we make this card be in both circles at the same time?
   - What do you notice about these cards?
7. After students have figured out the Venn Diagram give them the *Venn Diagram*. Have them work in their groups and fill out the sheet by drawing what they have in their circles. One sheet for each student.
8. Discuss with the class the observations as each group moved the grouping circles to become Venn Diagrams. Introduce the Venn Diagram pocket chart and explain the meaning of the different sections. Place a label at the top of the two sections of the pocket chart.
9. Using the overhead set of *Zooba Cards* sort them as a class using *Sorting Labels* that overlap. Have students place the identical paper set of *Zooba Cards* in the Venn Diagram pocket chart.
10. Discuss other things that can be sorted in the Venn Diagram. (e.g., buttons, words, pattern blocks, etc.)
11. Have students record observations in their math journals.

Assessment Suggestions

- During these activities walk around and observe the students. Make notes of questions they ask one another, conversations they have, and thought processes you observe. Make note of difficulty and mastery of these activities.

- When adding the Venn Diagram to the lesson ask many questions for understanding. Observe interactions and conversations they are having with one another.
- Give students the *Venn Diagram* and place some buttons at each table. Have students sort the buttons into the recording sheet.
- Students can be invited to a table one at a time to sort items into a Venn Diagram for you.
- As part of a class discussion explore other items/categories for sorting.

Curriculum Extensions/Adaptations/ Integration

- Add a third circle to the Venn diagram for sorting purposes.
- Make a set of different colored, different shaped pieces from construction paper. On half of them put a frown on the other half put a smile. Use these for sorting into the grouping circles and the Venn Diagram.
- Use a variety of items for sorting. (e.g., buttons, attribute blocks, pasta, lids, etc.)
- Play "Guess My Rule." Look at students clothing and pick one attribute. (e.g., brown pants, stripes, shoes that tie, etc.) Have 3 or 4 students come to the front of the room that fit your rule. Now ask the class if they can place another student in your line that fits your rule. Give clues as needed. When all the students have been placed in the line at the front of the room ask, "What is my rule?"
- Some students may need items to sort with just two attributes, to start off with, like blue and red buttons. Let students work in groups and discuss their thinking.
- Let students come to a table and help you sort items into the Venn Diagram. Offer suggestions for why you sort a certain way. Ask questions to help students sort a few items on their own.
- Provide sorting labels in the students' native tongue.

Family Connections

- Send home an activity sheet asking parents to help students sort laundry into the following categories; socks, shirts, and pants.
- Send home a letter asking parents to help students sort the contents of a grocery bag after a trip to the store. Use the following categories: hard things/soft things, cans/boxes/bottles, and items they like to eat/items they don't like to eat.
- Prepare a take home bag, which includes sorting activities for the students to share with their families.
- Have the students make their own set of *Zooba Cards* to take home.
- Send home a letter asking families to send in things that can be sorted as a class. (e.g., buttons, stickers, pasta, toy cars, plastic lids, etc.)

Additional Resources

Books

3 Little Firefighters, by Stuart Murphy; ISBN 9780060001209

Dave's Down-to-Earth Rock Shop, by Stuart Murphy; ISBN 9780064467292

Sorting Foods, by Patricia Whitehouse; ISBN 9781588107473

Let's Sort, by D. Bauer, D. Olson, T, Olson; 9780736820141

Sorting, by Henry Pluckrose; ISBN 9780516454580

Sorting and Sets, by Henry Pluckrose; 9781597710381

The Button Box, by Margarette S. Reid; 9780140554955

Web sites

http://nlvm.usu.edu/en/nav/vlibrary.html

http://www.carlscorner.us

http://teacher.scholastic.com/maven/cafeteri/index.htm

http://teacher.scholastic.com/max/

http://www.scholastic.com/clifford/play/sortitout/noflash.htm

http://www.sitesforteachers.com

http://www.edhelper.com

http://www.teacherplanet.com

http://www.worksheets4teachers.com

http://www.abcteach.com

http://www.primarygames.com

http://www.songsforteaching.com

http://www.theteacherscorner.net

http://www.softschools.com

http://illuninations.nctm.org

http://www.ucutips.org

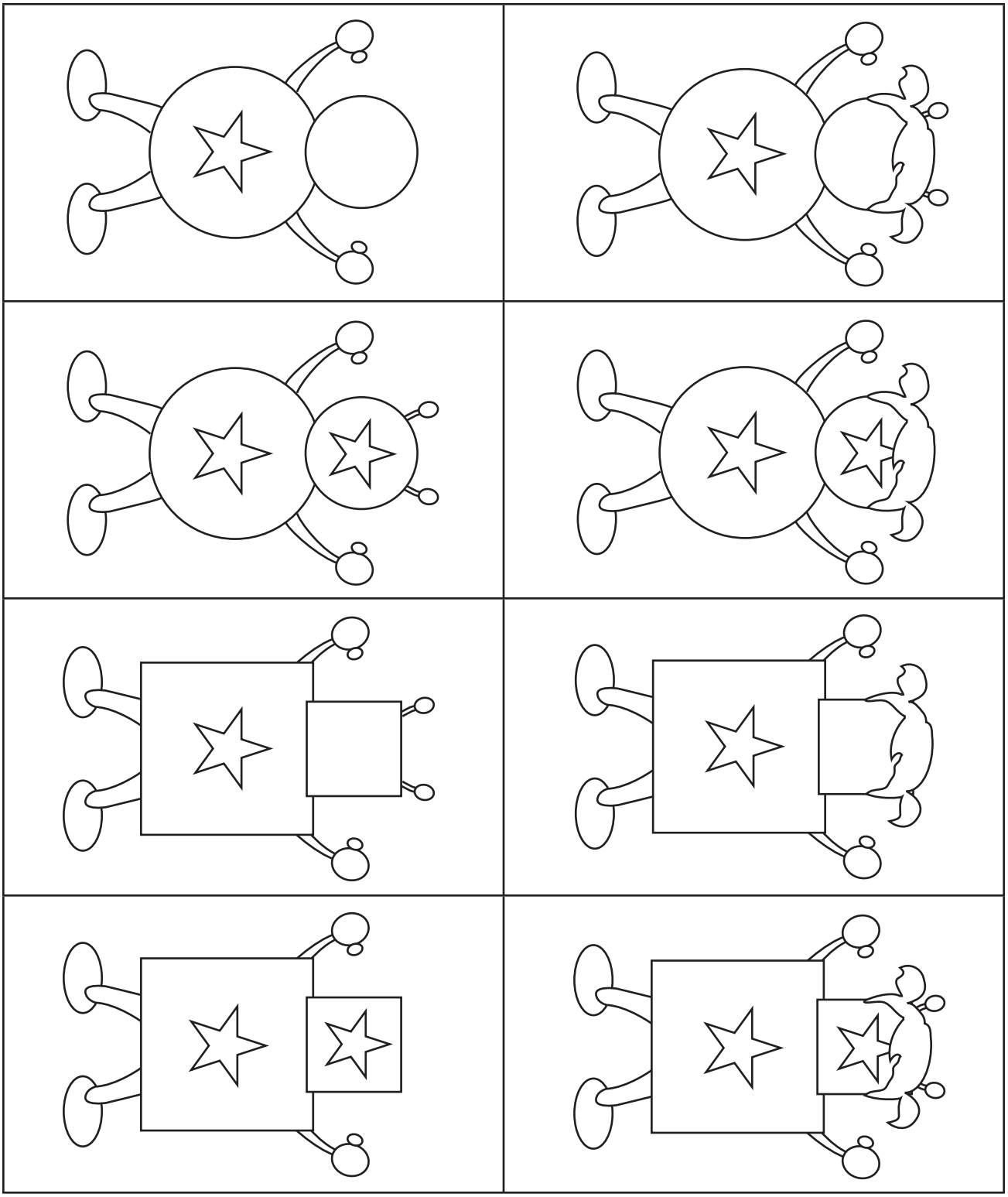
http://www.utips.org

Organizations

National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 20191-1502 (703) 620-9840, http://www.nctm.org

Zooba Cards

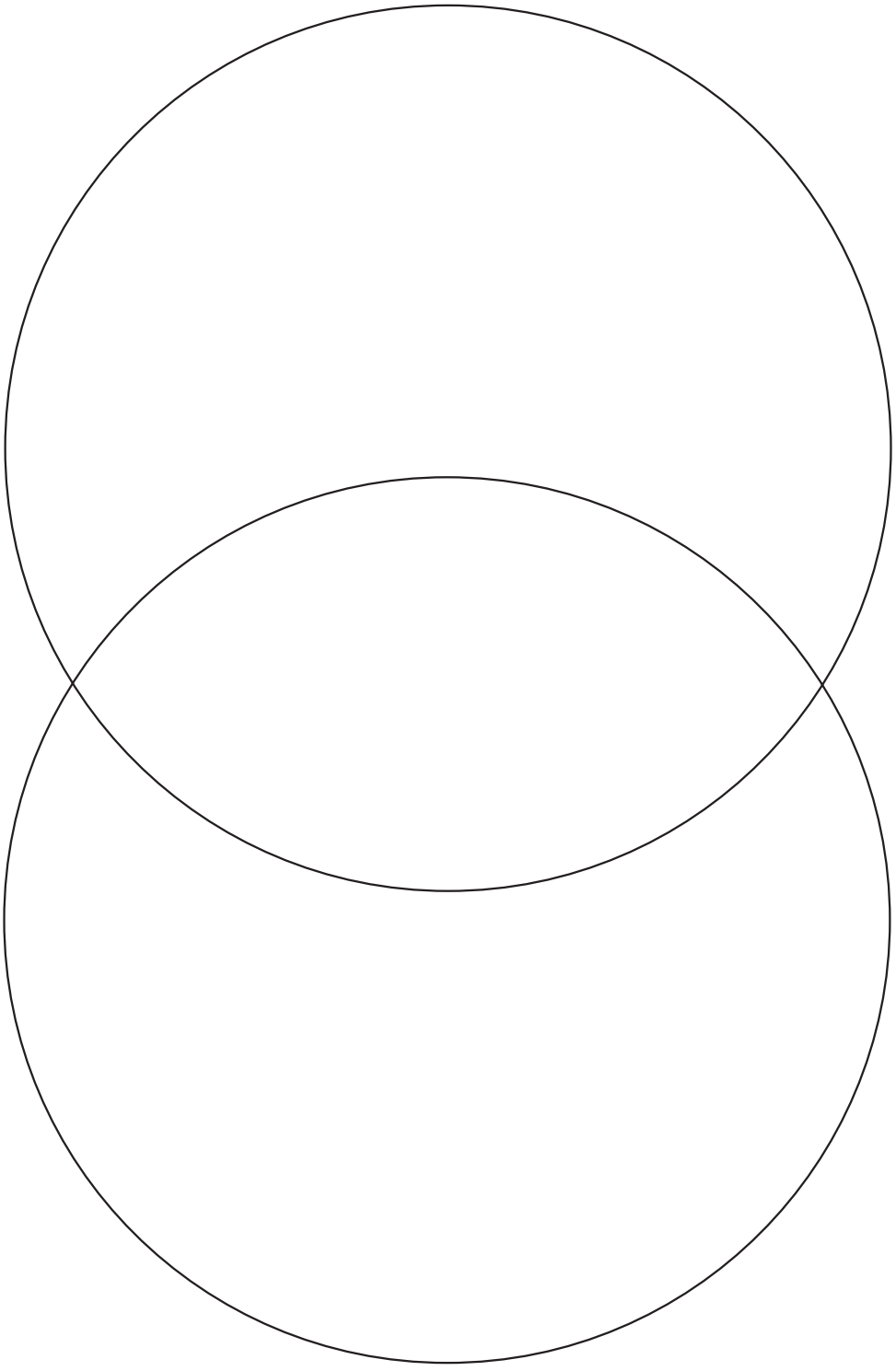
Make two copies on white card stock for each set of Zooba Cards. Color one set purple and the other set green by tracing around the inside of the shapes. Leave the remainder of the cards white.



Sorting Labels

One Star	Two Stars
Hair	No Hair
Circle	Square
Antenna	No Antenna
Purple	Green

Venn Diagram



Welcome to the Incorporated Corporation of Repetition Incorporated

Math Standard II

Objective 1

Standard II:

Students will identify and use number patterns and properties to describe and represent mathematical relationships.

Objective 1:

Recognize, describe, and represent patterns with more than one attribute.

Intended Learning Outcomes:

5. Understand and use basic concepts and skills

Content Connections:

Content I-2; Develop fine motor skills

Connections

Background Information

The following activities are designed to use with students in small group settings. They are ideal for use in centers or stations. Depending on the needs of students and teachers, they may also be used as whole class instructional opportunities. It is important for students to notice patterns in their environment and daily activities. Help students recognize patterns in music and books. Help them see that daily routines, like breakfast, lunch and dinner are also patterns. Patterns should be a fun and educational part of a first grade classroom.

Research Basis

Davidson, N. (1990). *Cooperative Learning in Mathematics. A Handbook for Teachers.* ISBN 0-201-23299-5

Small-group cooperative learning provides an alternative to both traditional whole-class instruction and individual learning. Frequent use of small-group procedures has a profound impact upon the classroom climate. The classroom becomes a community of learners actively working together in small groups to enhance each ones mathematical knowledge.

Muth, D.K. (1997). Using cooperative learning to improve reading and writing in mathematical problem solving. *Reading & Writing Quarterly,* Jan-Mar, Vol. 13, Issue 1.

This article deals with four parts of cooperative learning. Part one is how cooperative learning plays an important role in helping students solve problems. Part two emphasizes the importance of communicating mathematical concepts through cooperative learning. Part three gives specific suggestions for implementing cooperative learning in the classroom. The final section presents classroom examples.

Ding, M., Li,X., Piccolo, D., & Kulm, G., (2007). Teacher interventions in cooperative-learning mathematics classes. *The Journal of Educational Research,* Jan.-Feb. Vol. 100 No. 3.

The potential of cooperative learning to improve students' academic and social performance has been widely recognized. In this article the authors explain how to balance peer resource and students' independent thinking and how to use peer resource to improve students' thinking. The authors also suggest detailed techniques to address students' thinking, such as identify, diversify, and deepen their thinking.

Invitation to Learn

Materials

- ❑ Music
- ❑ CD player

This activity is called "Pattern Dance." Play an age appropriate piece of music with a good pattern. The Harry Potter Soundtrack works well. Have the students listen quietly. After listening to the music a couple of times discuss the pattern in the song as the melody changes. Listen to the music again, pausing when there is a new melody. Label each change in the melody to get a pattern for the song (e.g., AABBC). Ask the students to describe how the melody of each section makes them feel. Title each section appropriately (e.g., jumpy, happy, etc.). Have the class come up with a movement for each title. After the entire song is completed, play it for the students and do the "Pattern Dance."

Instructional Procedures

Materials

- ❑ *Pattern Fish*
- ❑ *Patterns*
- ❑ Photographs of patterns
- ❑ Disposable cameras
- ❑ *Patterns at Home*

Pattern Pictures

1. Before doing this lesson take photographs of patterns that are in the community. (The fence at school or the pattern in the bricks at school.) Get them developed and have them ready for students to look at and explore.
2. Read the book *Pattern Fish* by Trudy Harris. As you read the book discover with students patterns in the words, borders, and illustrations. Identify the patterns. This book is so detailed it may be one lesson by itself.
3. Read the book *Patterns* by Henry Pluckrose. Discuss other places where patterns can be identified.
4. Show students photographs of patterns from around the community, and discuss the different types of patterns.
5. Ask students where they see or use patterns. Some examples are in bedtime routines, breakfast, lunch and dinner, or sunrise and sunset.

6. Send home a disposable camera with the students one at a time. Send the camera in a Ziploc bag with a note that has very specific instructions to the parents. Allow each student to take two pictures of patterns they identify in their environment.
7. After all students have had a turn and the pictures have been developed, have each student take both pictures and glue their favorite one to the *Patterns at Home* black line. Help students label the pattern in their picture.
8. Students will then complete the page in their neatest handwriting by writing a description of the pattern in their picture. They will then color the border and empty spaces on the page to match the pattern label that is in their picture. They may add as many pattern details as they wish.
9. When all students are finished, take the pages and make a class book of patterns for the students to enjoy at independent reading time.

Pattern Trains

Materials

- ❑ Cloth bags
- ❑ Unifix® cubes
- ❑ *Pattern Trains*
- ❑ Crayons

1. Note: The first time *Pattern Trains* is played, use the trains with six squares and have students pull out three cubes and repeat the pattern. As students progress, they can use the eight or ten cube train pages. For this example, the ten cube trains will be used.
2. Have students work in pairs. Give each pair a labeled cloth bag with a variety of colored Unifix® cubes (about ten per bag) and one *Pattern Train* page per student.
3. Have one student pull five cubes out of the bag without looking. The other student links the cubes in the order they were removed from the bag.
4. Both students use their own *Pattern Train* page to record the pattern that has been created by coloring the squares appropriately. Because each pattern train is ten cubes long on the black line each pattern will be repeated twice on the *Pattern Train* page.
5. After the pattern is colored students label the pattern (e.g., ABC. 123.) and record it in the space provided.
6. When the pattern is recorded the cubes are separated and returned to the bag. The students switch roles. One student pulls out five cubes and the other student links the cubes. This process is repeated until the pattern trains are complete.

Pattern Flip Book

1. Make the *Pattern Flip Book* before hand. The instructions are printed on the black line.
2. Students look at the pattern label that is displayed on the *Pattern Flip Book*.
3. Students use the printed foam sheet cut into squares to recreate that pattern from the book on the desk in front of them.
4. After making the pattern with the foam sheet squares, students will create the same pattern using stamps on the *Flip Book Recording Sheet.*
5. Have students label their pattern appropriately in the space provided.
6. Flip the page in the book and repeat the activity.

Materials

- ❑ *Pattern Flip Book*
- ❑ Printed foam sheets
- ❑ *Flip Book Recording Sheet*
- ❑ Stamps
- ❑ Stamp pads

Pattern Paths

1. Create *Pattern Path Game Boards*. (Students can color their own *Pattern Paths Game Board.*) To make *Pattern Paths* choose five different colors. Randomly color in the spaces making sure that the same color does not touch more than three times in a row.
2. The number cube needs to be made and have two fours, two fives, and two sixes on it.
3. Students take a *Pattern Paths Game Board, Pattern Paths Recording Sheet,* one Pattern Paths Number Cube, crayons and ten squares of white card stock. This game can be played alone or with a partner.
4. The student places a white cardstock square marker on the start space. The student rolls the number cube and moves that many spaces. They place a white square marker on that space.
5. Now they look at where they started and where they ended. They record the pattern between the white markers with crayons on the *Pattern Paths Recording Sheet*, and label the pattern.
6. The white markers stay on the board and the student rolls the number cube again. The process is repeated.
7. When you play with partners have students take turns rolling the number cube. Both students will record all patterns on their individual *Pattern Paths Recording Sheets*.

Materials

- ❑ *Pattern Paths Game Board*
- ❑ *Pattern Paths Recording Sheet*
- ❑ Pattern Path Number Cubes
- ❑ White card stock
- ❑ Crayons

Materials

- ❑ *Pattern Wheels*
- ❑ *Pattern Wheels Recording Sheet*
- ❑ Stamps
- ❑ Stamp pads

Pattern Wheels

1. Prepare the *Pattern Wheels* before hand. Instructions are included on the black line master.
2. Each student gets a *Pattern Wheel* and begins at any place on the wheel.
3. Students turn the wheel one time and record the image with the stamps on the *Pattern Wheels Recording Sheet*.
4. Students then turn the wheel one image and record that image with the appropriate stamp on the *Pattern Wheels Recording Sheet*.
5. One pattern is made when the wheel has been turned five times.
6. Students should label each pattern appropriately in the space provided.
7. One *Pattern Wheel* can create many different patterns for the students. They may use one wheel more than one time in a row.

Materials

- ❑ *Pattern Rain Cloud Shapes*
- ❑ Construction paper
- ❑ Glue

Pattern Rain Clouds

1. Copy the *Pattern Rain Cloud Shapes* on white paper. Cut long sheets of construction paper in half the long way.
2. Students will create a growing pattern with lightning bolts and clouds. They begin by cutting out the *Pattern Rain Cloud Shapes*. Each student will need one sheet.
3. Students glue one lightning bolts on the left side of the paper. A cloud goes next to the lightning bolt.
4. Now have the students glue two lightning bolts and then one cloud. Next three lightning bolts and one cloud.
5. The pattern continues until you run out of shapes.

Assessment Suggestions

- Observing students throughout the activities is an effective informal formative assessment for teachers.
- Some of the activities have worksheets that students complete while working on the activity. These worksheets are an excellent source of assessment.
- Math journals are a great assessment for diagnosis of understanding.

- Call students over to a table one at a time to complete any of these activities independently, as a performance assessment.
- Observe the students working on the various activities and assist as needed. Make notes of struggles as well as successes.

Curriculum Extensions/Adaptations/ Integration

- Have students label the patterns with letters or numbers.
- Give students a container of fruit loops and a piece of string. Have them create a pattern necklace.
- Leave any of these activities out for a fast finisher item.
- Give students some M&M's and read *The M&M's Color Pattern Book* as a class while the students create the patterns.
- Assign students to work in pairs throughout the unit.
- Adjust black line masters to have more or less problems to fit student's special needs.

Family Connections

- Send home a letter at the beginning of the pattern unit that encourages parents to look for patterns in everyday life.
- Allow students to take home a *Patterns Paths Game Board* to play with family members.
- Send home an assignment where the student is to bring a pattern to school. It could be fruit loops, stickers, macaroni, etc attached to a sheet. In the letter that explains the assignment give examples of different pattern types. (e.g., AB, ABBA, ABCA)

Additional Resources

Books

Pattern Fish, by Trudy Harris; ISBN 9780761317128

The M&M's color Pattern Book, by Barbara Barbieri; ISBN 9780439488435

Patterns, by Henry Pluckrose; ISBN 9780516454552

Math=Fun! Shapes and Patterns, by Jerry Pallotta; ISBN 9780545002400

Patterns, by Bev Schumacher; ISBN 9780976870630

Lots and Lots of Zebra Stripes: Patterns in Nature, by Stephen R. Swinburne; ISBN 9781563979804

Patterns, by Sara Pistoia; ISBN 9781592966905

Zoe's Hats: A Book of Color and Patterns, by Sharon Lane Holm; ISBN 9781590780428

Busy Bugs: A Book About Patterns, by Jayne Harvey, J. Adnet, B. Adnet; ISBN 9780448431598

A Pair of Socks, by Stuart J. Murphy, Lois Ehlert; ISBN 9780064467032

Web sites

http://nlvm.usu.edu/en/nav/vlibrary.html

http://www.carlscorner.us

http://www.edhelper.com

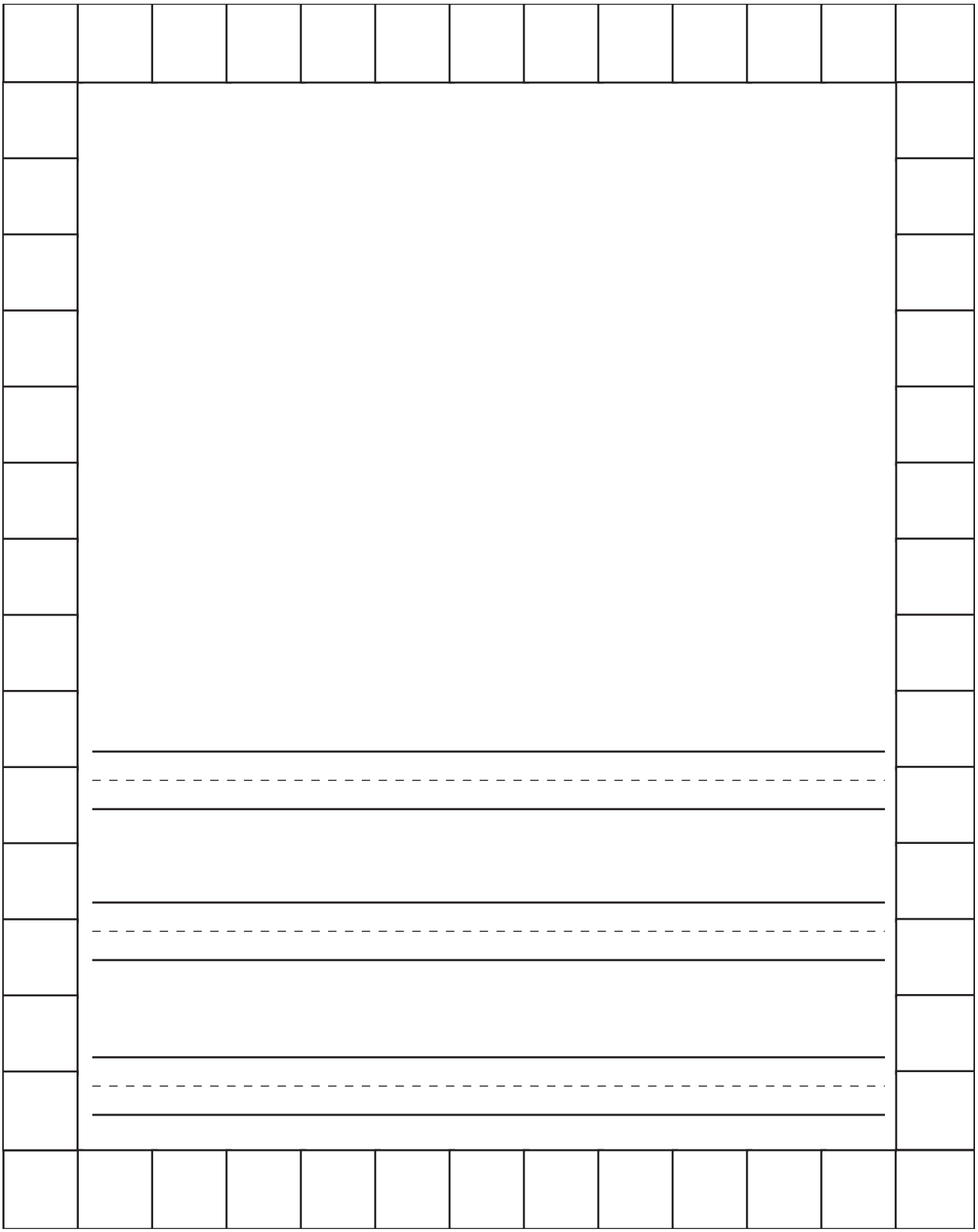
http://www.primarygames.com

http://illuninations.nctm.org

Organizations

National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 20191-1502 (703) 620-9840, http://www.nctm.org

Patterns at Home

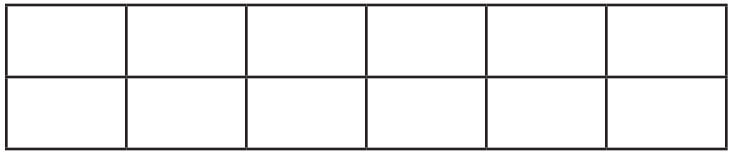


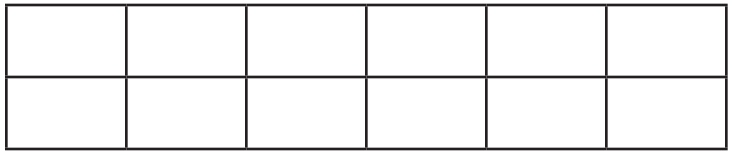
Name _____

Code Letter

Pattern Trains (6 square)

1 

2 

3 

4 

5 

6 

7 

8 

9 

10 

11 

Name _____

Code Letter

Pattern Trains (8 square)

1 

2 

3 

4 

5 

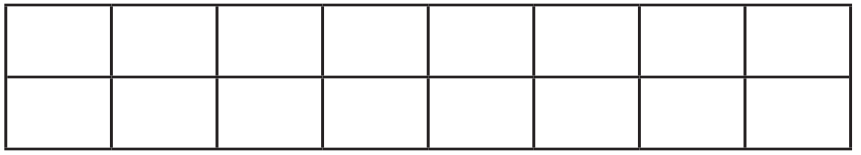
6 

7 

8 

9 

10 

11 

Name _____

Code Letter

Pattern Trains (10 square)

1

2

3

4

5

6

7

8

Pattern Flip Book

AB	AAB
ABC	AABB
ABCD	AABBC
ABB	AABC

Pattern Flip Book

ABCB	ABBAC
ABAC	ABCA
ABCC	ABCDC
ABBC	ABABC

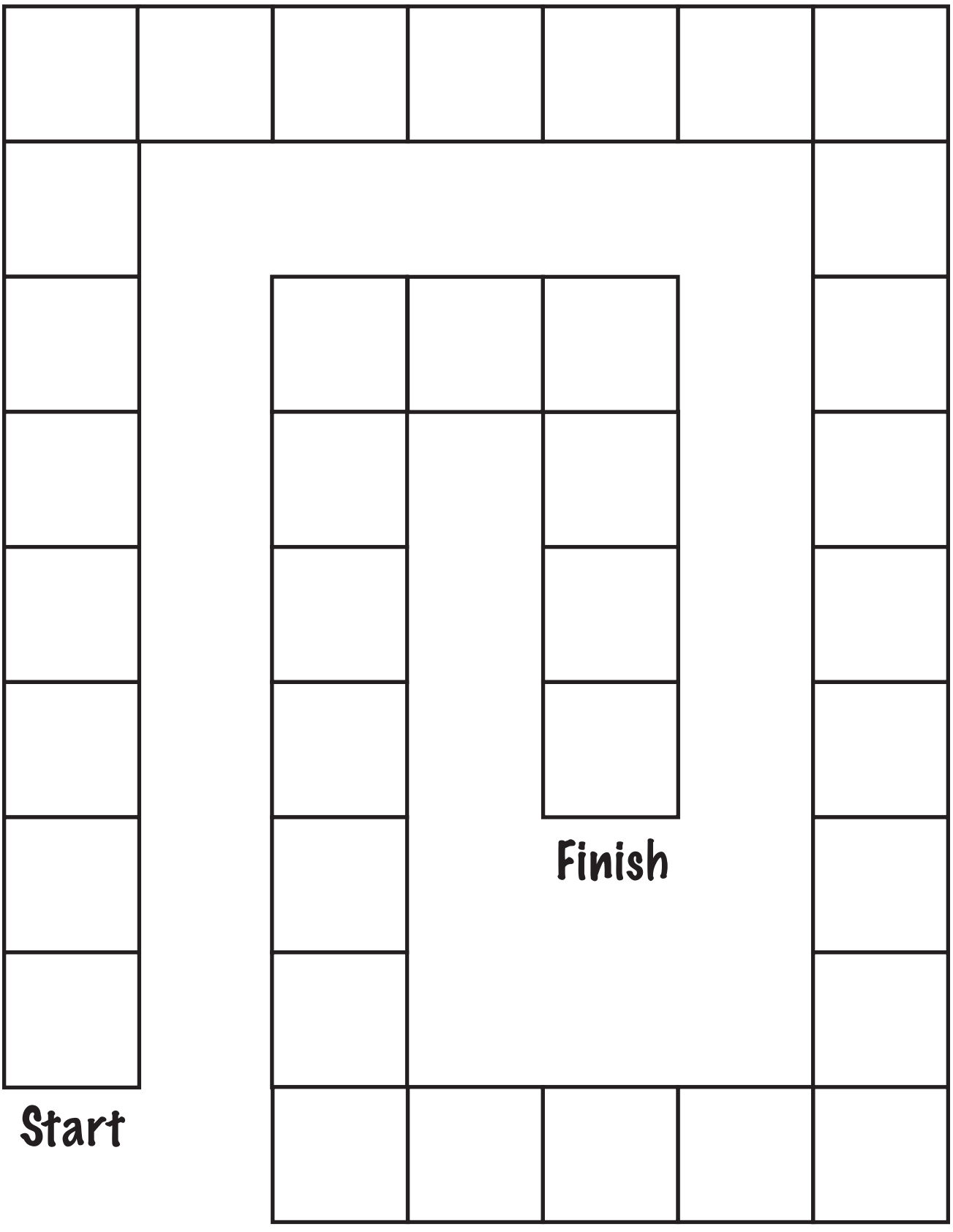
Pattern Flip Book

ABCBA	

Name _____

Recording Sheet

Pattern Paths Game Board

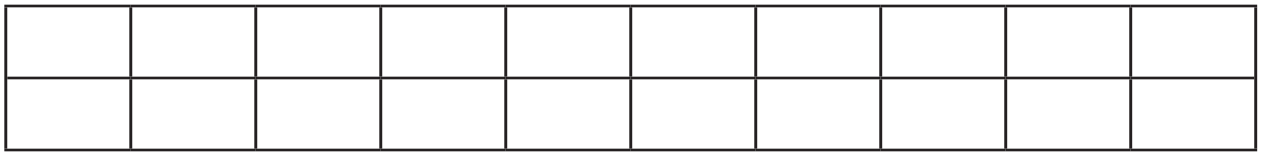


Name _____

Pattern Paths Recording Sheet

1

2



3

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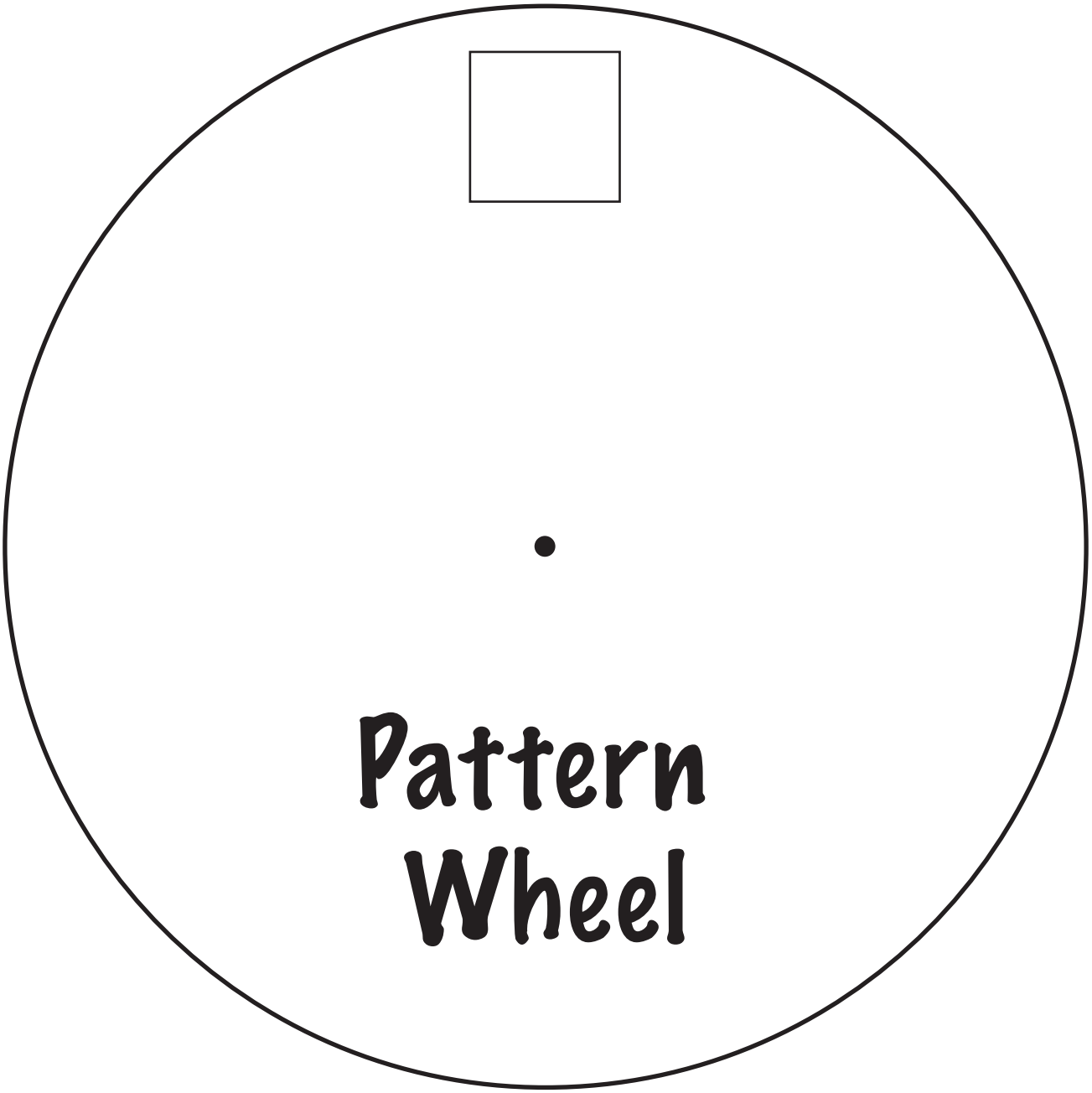
8

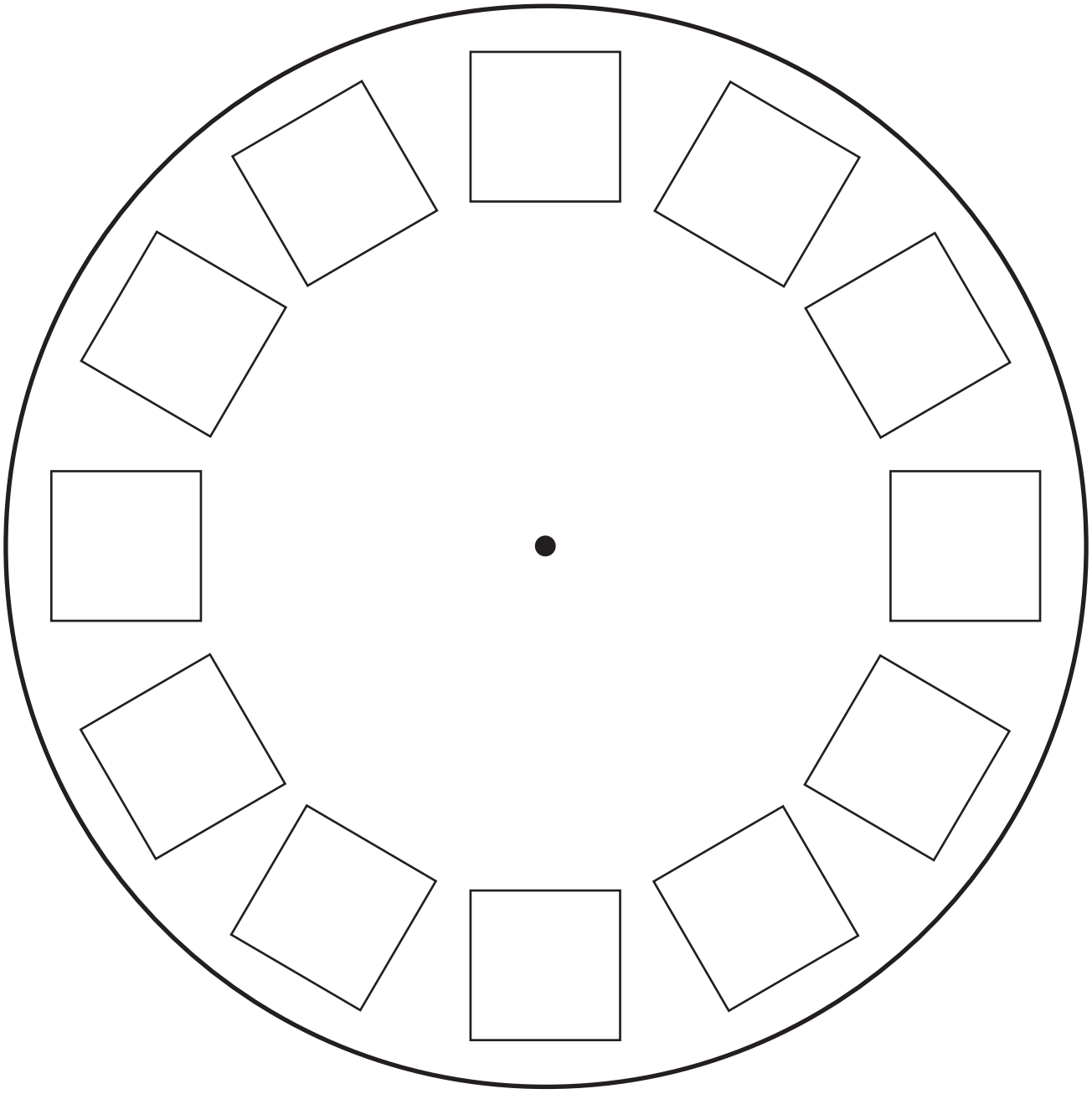
Pattern Wheel

Copy onto colored card stock. Cut out the square. Laminated then attach to other half.

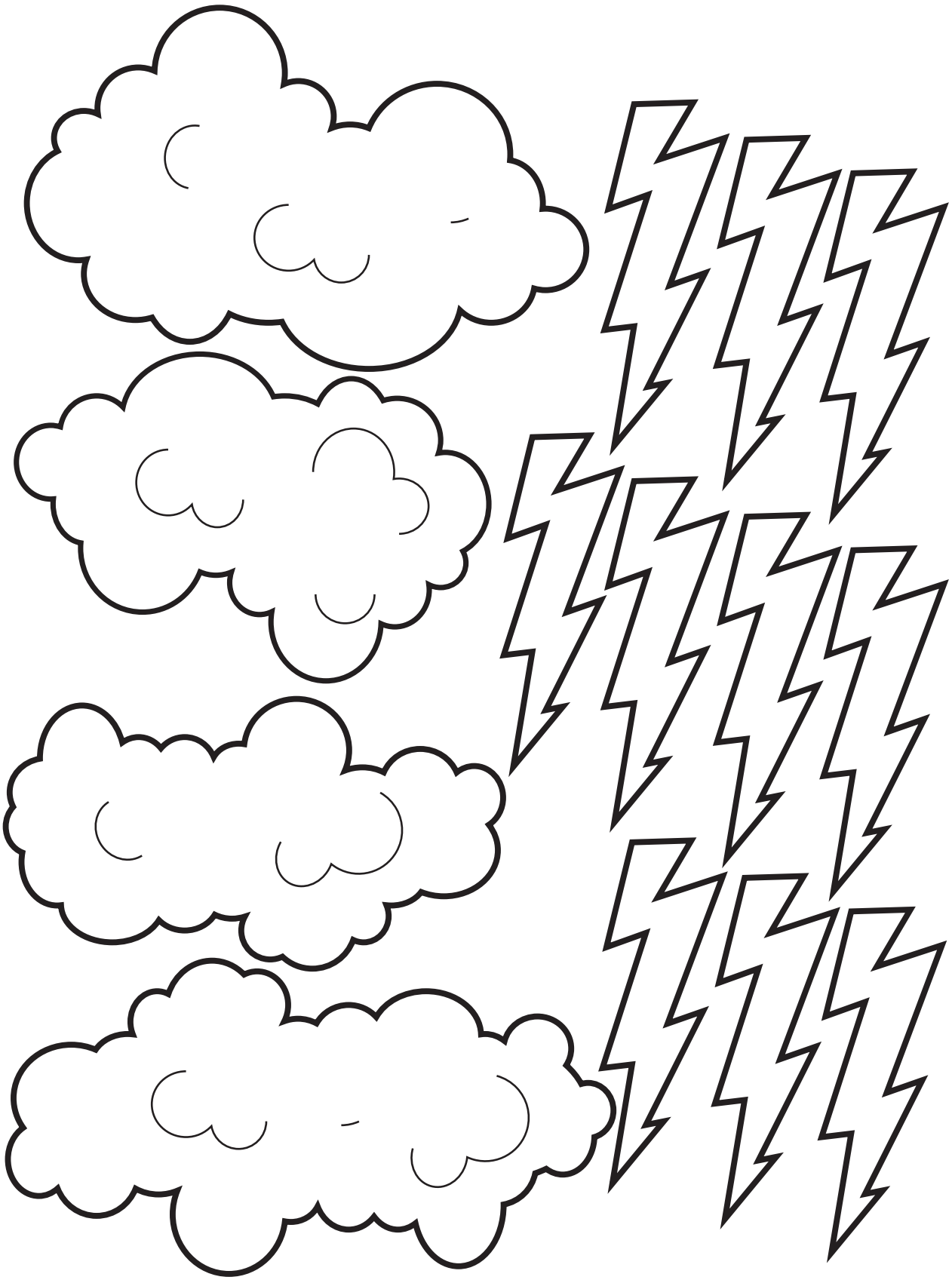


Pattern Wheel

Copy onto white card stock. Using two, three or four stamps randomly stamp all the squares. Laminate then attach to other half using a brad.



Pattern Rain Cloud Shapes



Math I-3

Activities

Operations

The Magic of Numbers

Standard I:

Students will acquire number sense and perform simple operations with whole numbers.

Objective 3:

Model, describe, and illustrate the meanings of addition and subtraction and use these operations to solve problems.

Intended Learning Outcomes:

1. Demonstrate a positive learning attitude.

Content Connections:

Language Arts VIII-6; write in different forms and genres

Math Standard I

Objective 3

Connections

Background Information

In order for a student to perform math operations and problem solving, they must first have number sense. They must have an understanding of basic number and numeration concepts. Giving students a concrete representation of what makes up a number will help develop required number sense. Teachers need to provide students the opportunity to explore with objects and different representations of numbers. By taking students through concrete, representational and abstract methods of learning, they will develop a deep understanding of the concept. Through experiences provided in the classroom they should be able to transfer knowledge to real-world quantities.

Research Basis

Burns, M., Silbey, R., (2001). Math Journals Boost Real Learning. *Instructor,* April 2001, Vol.110, Issue 7.

This article explains that a math journal is one of the best ways to introduce writing into a math class. It helps students expand their thinking and make sense of problems that sometimes leave them confused and/or frustrated.

Bender, W., (2005). Differentiating Math Instruction. p.14-20.

The importance of developing number sense is addressed in this part of the book. Bender explains that without number sense, the child may never succeed in math at even the lowest levels, since concepts such as numeration, addition, or subtraction would have no substantive meaning. Clearly, development of number sense is a critically important first step in math instruction.

Invitation to Learn

Materials

- ❑ *"12 Ways to get to 11"*
- ❑ Magician's cape
- ❑ Magic hat
- ❑ Items to pull from hat
- ❑ *Card Stack*
- ❑ Magic wand
- ❑ *Magic Journal*
- ❑ *Out of the Hat*

Read *"12 Ways to get to 11"*. As you read the story have the students' count the items listed and make sure there are 11.

Instructional Procedures

Out of the Hat

1. Refer back to the page of the magician in *"12 Ways to Get to 11."* Tell the students that you are going to be a magician to see if you can make different numbers other than 11. Put magician cape and hat on and pick up the magic wand.
2. Fill a magic hat with different types of items. (Fill hat with nine items-three different types. Make sure items are simple and the students will be able to draw them in their journals quickly without a lot of detail.)
3. Tell students that you will need a volunteer from the audience.
4. Chose a student to come and draw a number from *Card Stack*.
5. Using magic wand, say "Abracadabra the items will appear." (Or some magic phrase that will make the experience more magical.)
6. Pull the number of items from your hat that is shown on the card.
7. The students count aloud with you as you take the items from the hat.
8. Do a quick draw of the items on the board to show students how to draw them in their *Magic Journal* on the *Out of the Hat* journal page. Each student will need nine copies of this page for their *Magic Journal*.
9. Students will record in their *Magic Journal* the number that is drawn, and then draw the items that were pulled from the hat to represent that number.
10. Pull items from the hat until numbers have been represented from one to nine.

Materials

- ❑ Magician's cape
- ❑ Magic hat
- ❑ *Magic Signs (+)*
- ❑ *Magic Signs (-)*
- ❑ Items to pull from hat
- ❑ *Magic Journal*
- ❑ Magic wand

Magic Signs

1. Wearing a magician's cape, have a magician's hat with the large plus/addition, and equal sign in it, along with two different types of items. (Fill hat with 18 items – two different types)

2. Tell students that you are going to see what kind of magic can be pulled from the hat today.
3. Pull the plus/addition sign out of the hat and tell the students it is a magic sign that helps complete a number sentence to find how many in all.
4. Next, take the equal sign from the hat and explain that this magic sign helps complete the number sentence by making both sides equal, and the same.
5. Explain to students, that now we have our magic signs we need some numbers so the magic signs can do their magic.
6. Pull items from your hat as the students count the items with you. (Make sure that you pull different items from the hat.)
7. Count the items (e.g. two bugs and five blocks) Write the number of items in the blank number sentence and then have students count and find how many in all.
8. Do several of these as a class, then split class into learning groups with their own hat and have them develop their own number sentences.
9. In the groups they will take turns drawing items from their magic hats and the group will record in their *Magic Journal* the number sentences that they make. Emphasize that the number sentences all have to be different.
10. At the bottom of the *Magic Signs* journal page complete the blank number sentences, as a class to demonstrate the commutative property of addition. (e.g. 3+2=2+3)

Pick a Card any Card

Materials

- ❑ Magician's cape
- ❑ Magic hat
- ❑ *Magic Journal*
- ❑ Deck of cards
- ❑ *Card Stack*
- ❑ Large -/+ sign
- ❑ *Pick a Card Any Card*

1. Dressed in magician cape and hat, start lesson by doing a magic card trick for the students. Using any deck of cards, have a student draw a card from the deck. Tell the student to look at the card closely and make sure they do not forget it. Make sure they remember the color, number etc. While you are emphasizing this, glance at the card that will be above that card when they put their card back into the pile. Mix cards up a little by taking a couple off the top and bottom, but not moving the cards where the student placed the card they drew. From top of deck turn cards over one at a time, when you see the card you looked at the student's card will be the next one. Your students will be so impressed.
2. Tell students that there are many ways we can make number sentences. We can make them by counting objects, as we have

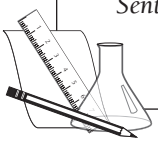
just learned. But, what are we going to do if we don't have blocks, bugs, etc? (elicit responses) We can use our math magic to find how many in all without objects to count.

3. Using *Card Stack,* have a student draw from your hand two cards then put them on the board on either side of the addition sign.
4. Show students how they can count the items on the cards to find how many in all or the total.
5. Put equal sign on board.
6. Count the shapes and draw the shapes on the board to represent the card, and then write the total number of shapes in the answer blank. (Show students a quick draw of how to make the shapes.)
7. Do several of these as a class.
8. Pair students giving each pair their own *Card Stack*.
9. Students will take turns drawing two cards from their partner and filling in their *Pick a Card Any Card* journal page in their journals. Each student will need four copies of this page for their *Magic Journal.* They will draw in the number of shapes from the card that they drew from their partner, and then write the answer. (Some students will have difficulty drawing the shapes. As a modification, those students can draw circles or use a tally mark for all cards instead of drawing the shape. Make sure the focus is not on drawing the shapes.)
10. Walk around the classroom observing that students are correctly drawing shapes and counting them correctly.

Magic Number Sentences

Materials

- ❑ 3x5 cards
- ❑ Magician's cape
- ❑ Magic hat
- ❑ Magic wand
- ❑ M&Ms, Skittles, etc.
- ❑ Small baggies
- ❑ *Magic Number Sentences*



1. Wearing magician's cape, give students a 3 x 5 card to write two of their own number sentences on. Make sure students write their name on their card (for assessment).
2. After they have completed the number sentences have the students drop them into the magic hat, tap the hat with your magic wand saying "This number sentence will magically appear again."
3. Using the students number sentences make representations of the sentence using M&Ms, Skittles, or some other type of treat, and put them in a baggie. Write students name on the baggie.
4. At the beginning of math, circle time or whenever you chose, tap hat and tell the number sentences to magically appear. Each

day pull out two or three baggies, and have the students use the representations of the treat to write the number sentence on their *Magic Number* Sentences journal page. Each student will need three copies of this page for their *Magic Journal*. Everyone will write the number sentence in their journals and solve it, and the student who put that number sentence in will get the treat.

5. After the students have written the sentence and solved it, ask the student who wrote the number sentence to talk about how they solved the problem. Use effective questioning to have the students talk about the commutative property of addition. Encourage the students to use appropriate math terms.

Magic Hat Worksheets

Materials

- ❑ *Magic Hat (+)*
- ❑ *Magic Hat (-)*
- ❑ *Magic Hat Problem Solving*
- ❑ Boxes
- ❑ Dry erase markers

1. Use the Magic Hat Worksheets for assessment and fluency. You may choose to laminate the worksheets and have them in Magic Math Boxes.
2. The students will go to a box and take out a hat to work on with a dry erase marker. You could have the boxes colored according to the level of difficulty.
3. There is a blank worksheet for you to add any variety of problems you would like to use.

__ Ways to get to __

Materials

- ❑ *__Ways to Get to ___* title page
- ❑ Materials to write and illustrate book (e.g. markers, crayons, watercolors, etc.)

1. For a language arts connection, students will make their own book about "eight ways to get to seven," "nine ways to get to eight," etc.
2. Do not put limits on this activity. Let students explore with different options, not just using two numbers to get the answer.
3. Differentiate this activity by assigning out different books titles. For the advanced learners give them the higher numbers, and for those that struggle give them the lower numbers to work with.
4. Have a class read aloud and let the students share their books as a celebration of learning.

Assessment Suggestions

- Check responses in *Magic Journals* for completeness and correctness.

- Observation of students, making sure students are completing activities correctly and not practicing mistakes.
- Student responses to effective questioning as you move around the classroom during completion of activities.
- *Magic Sentence* 3x5 cards
- *Magic Hat* worksheets
- To assess student's " __ Ways to Get to __" books, develop a rubric to meet your specifications.

Curriculum Extensions/Adaptations/ Integration

- This unit can be used for subtraction using the subtraction black line masters.
- Advanced learners could add 3 or more digits together, and use subtraction reciprocally.
- Allow advanced learners the opportunity to develop their own magic numbers trick.
- Provide students who struggle concrete objects for a longer period of time.
- At the end of the unit have a magic show that students will participate in.

Family Connections

- Send home *Magic Hat* worksheets for homework practice.
- Send home blank *Pick a Card Any Card* journal pages and have students complete them with their family members.
- After completing the unit using both addition and subtraction, have a magic show. Send home a celebration letter to parents telling them the students know the magic of numbers, and to celebrate they would like to have a magic show. Ask parents to help the students develop and practice a magic trick to perform. Invite parents to attend the show.

Additional Resources

Books

12 Ways to get to 11, by Eve Merriam; ISBN 978-0-689-80892-0

The Hershey's Kisses Addition Book, by Jerry Pallotta; ISBN 0439267285

MATH-terpieces The Art of Problem-Solving, by Greg Tang; ISBN 0-439-44388-1

Web sites

http://www.oswego.org/ocsd-web/games/Mathmagician/cathymath.html

http://www.aplusmath.com/games/index.html

http://www.dep.anl.gov/aattack.htm

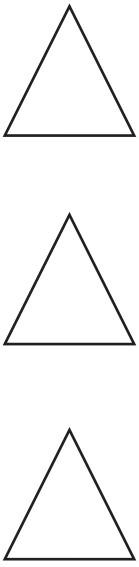
http://rubistar.4teachers.org/index.php

Card Stack - 1

1

2

3



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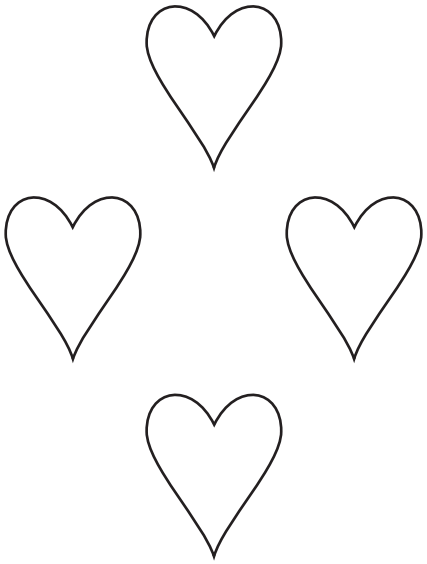
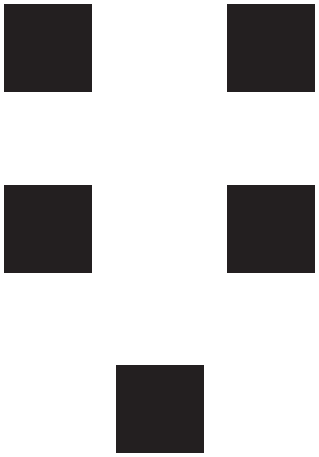


Card Stack - 2

5



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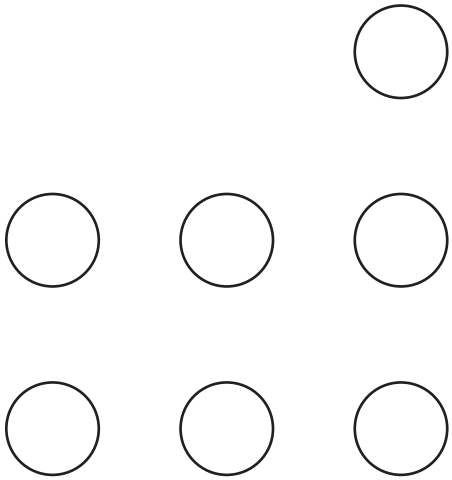

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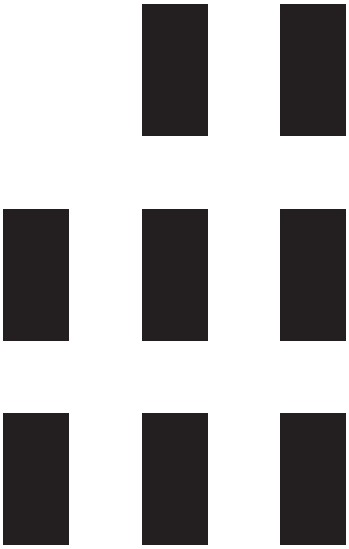
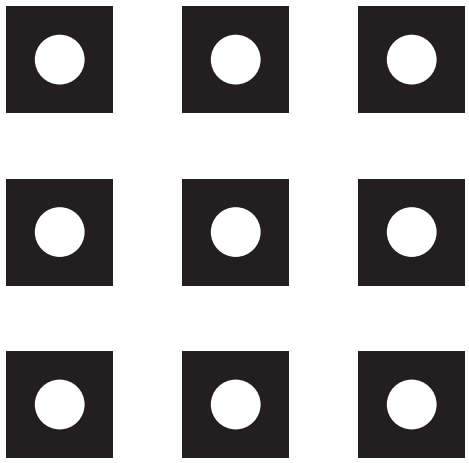
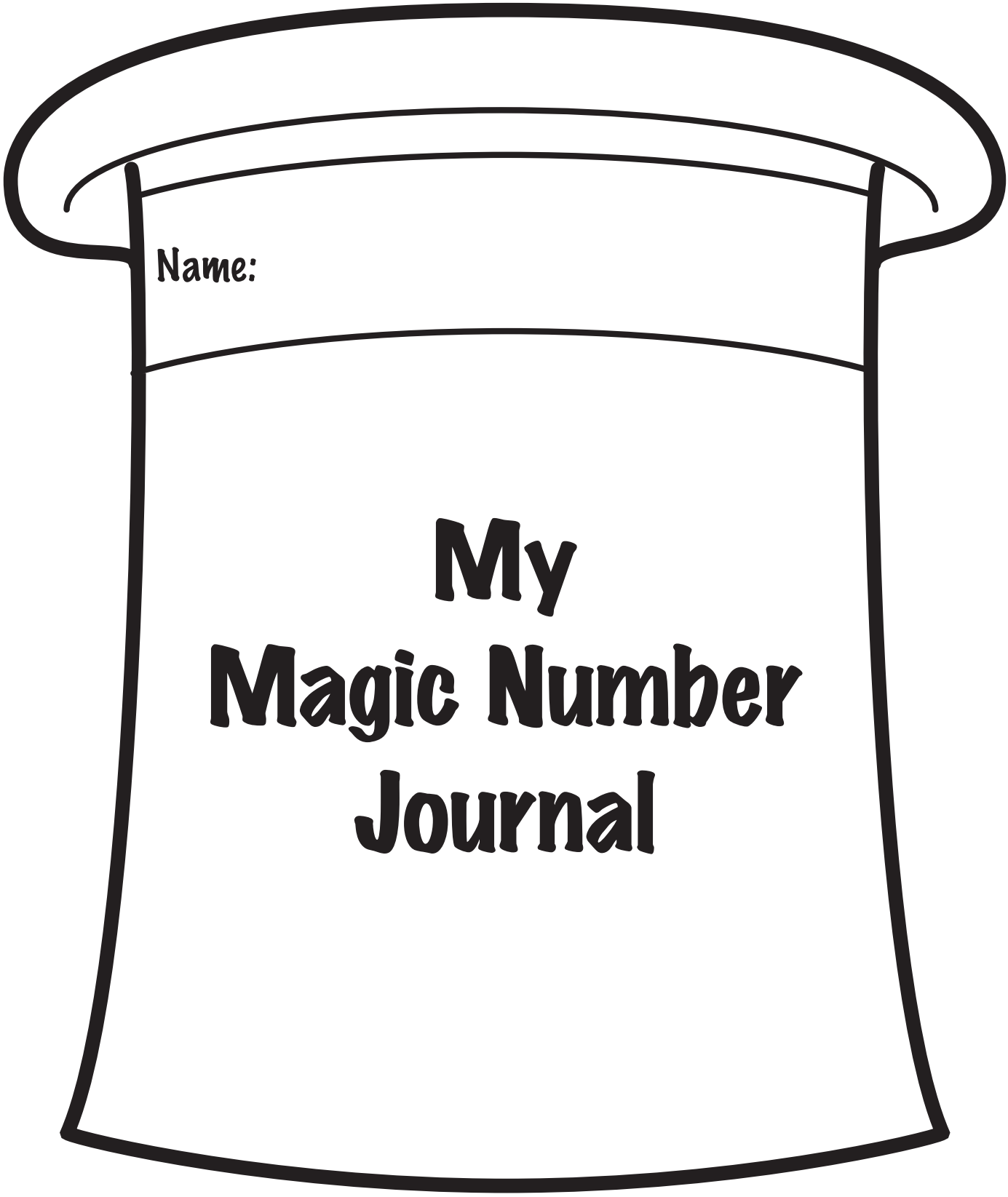
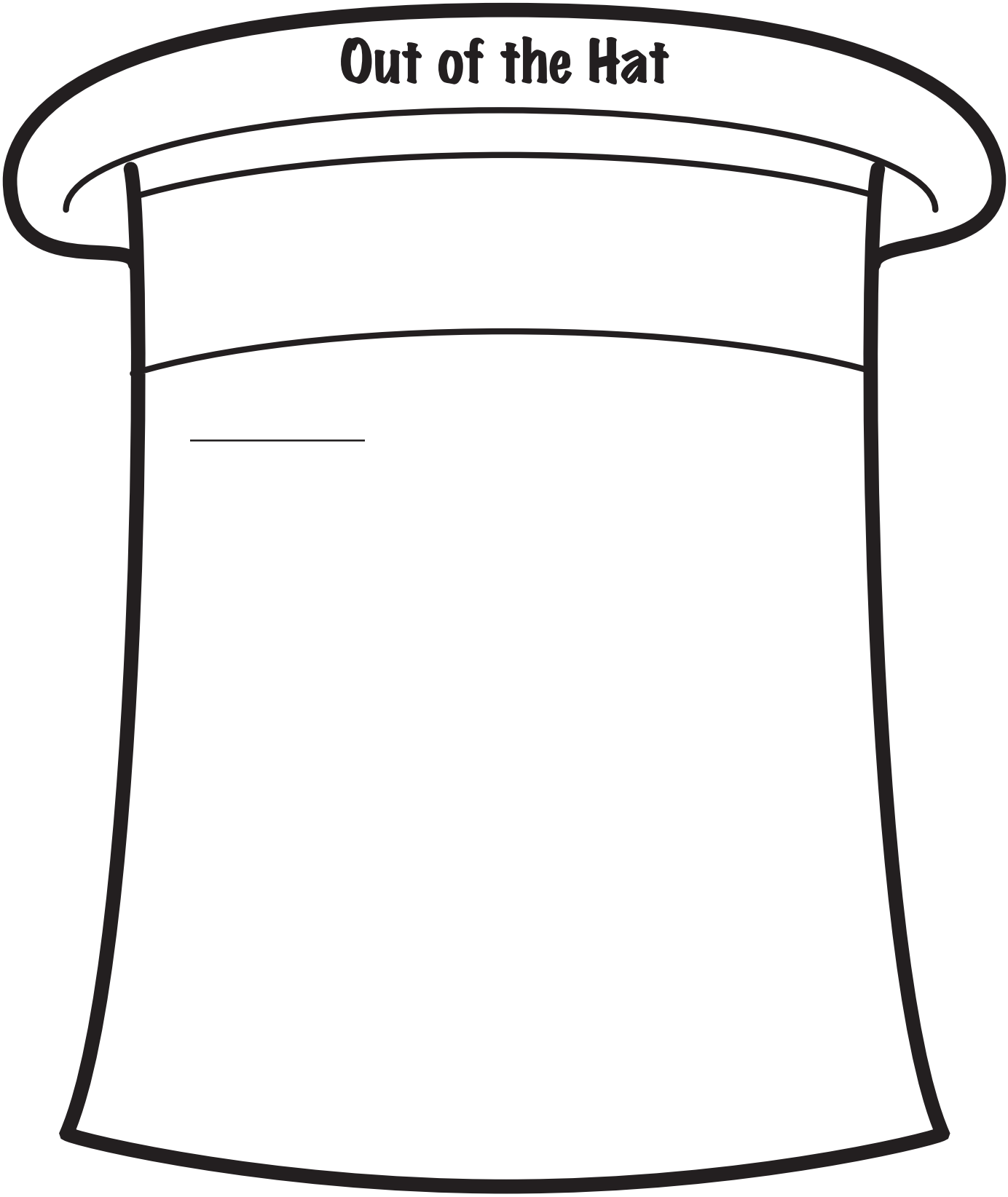
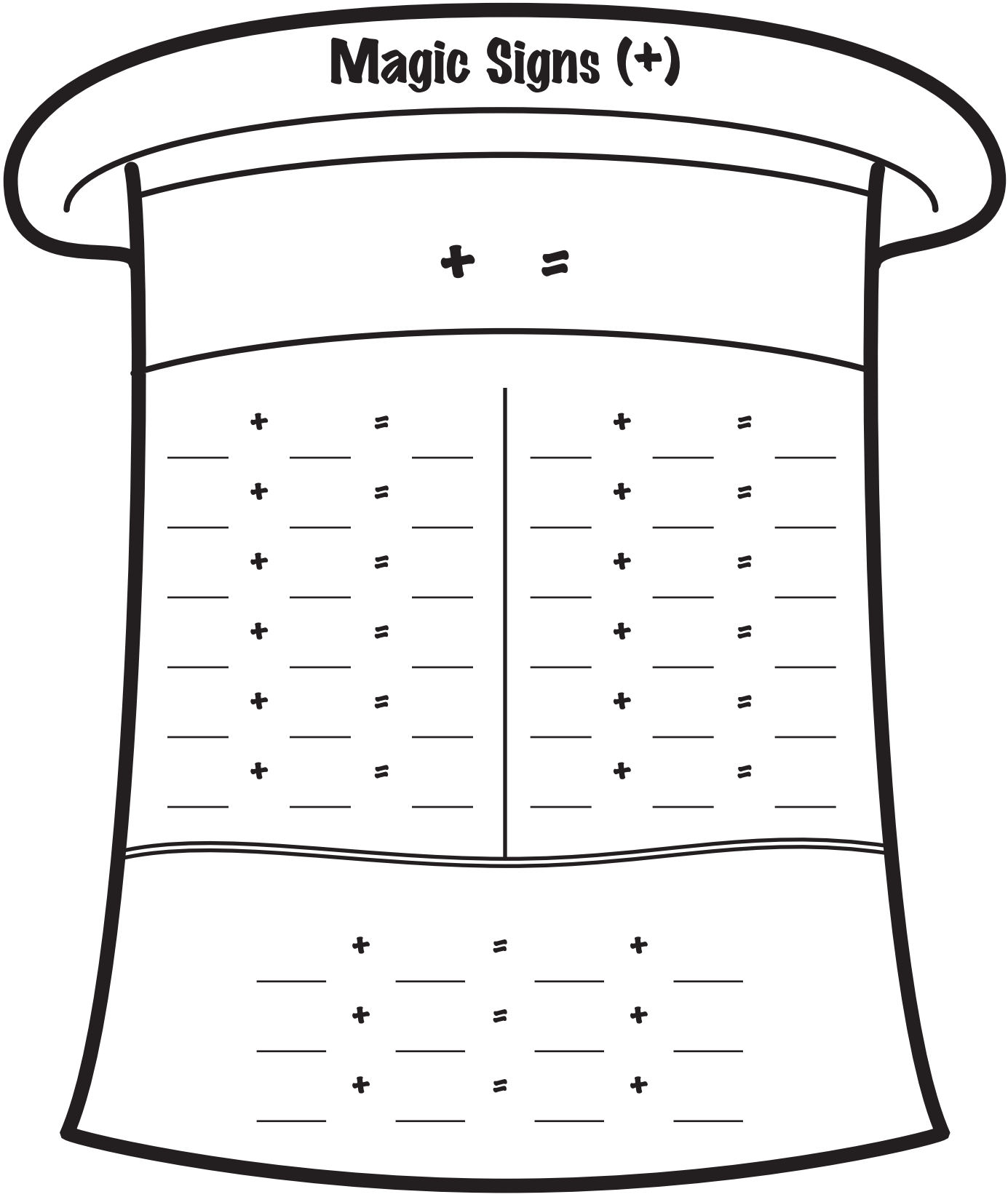


Card Stack - 3

9 	
	


Name:
My
Magic Number
Journal


Out of the Hat


Magic Signs (+)
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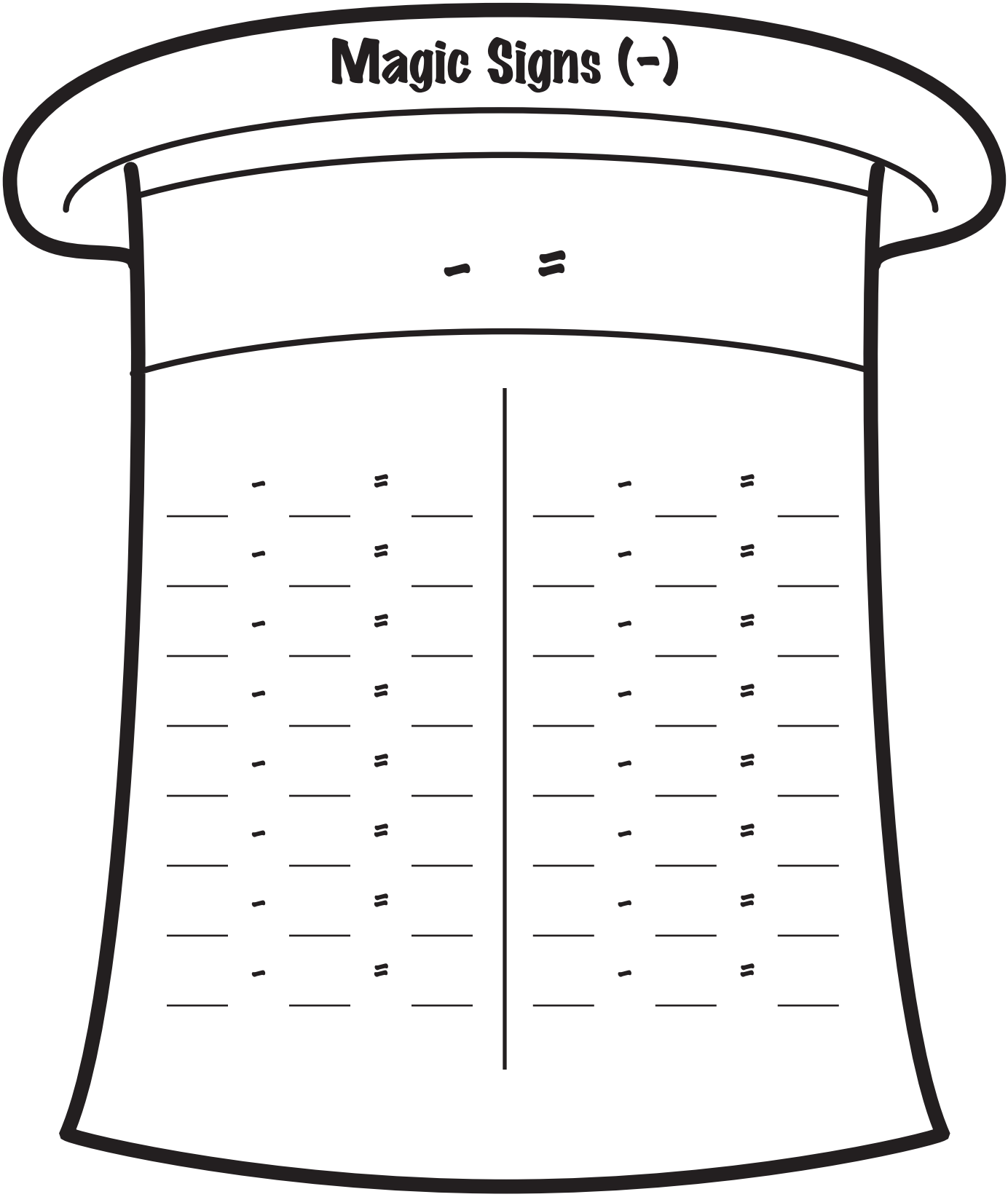
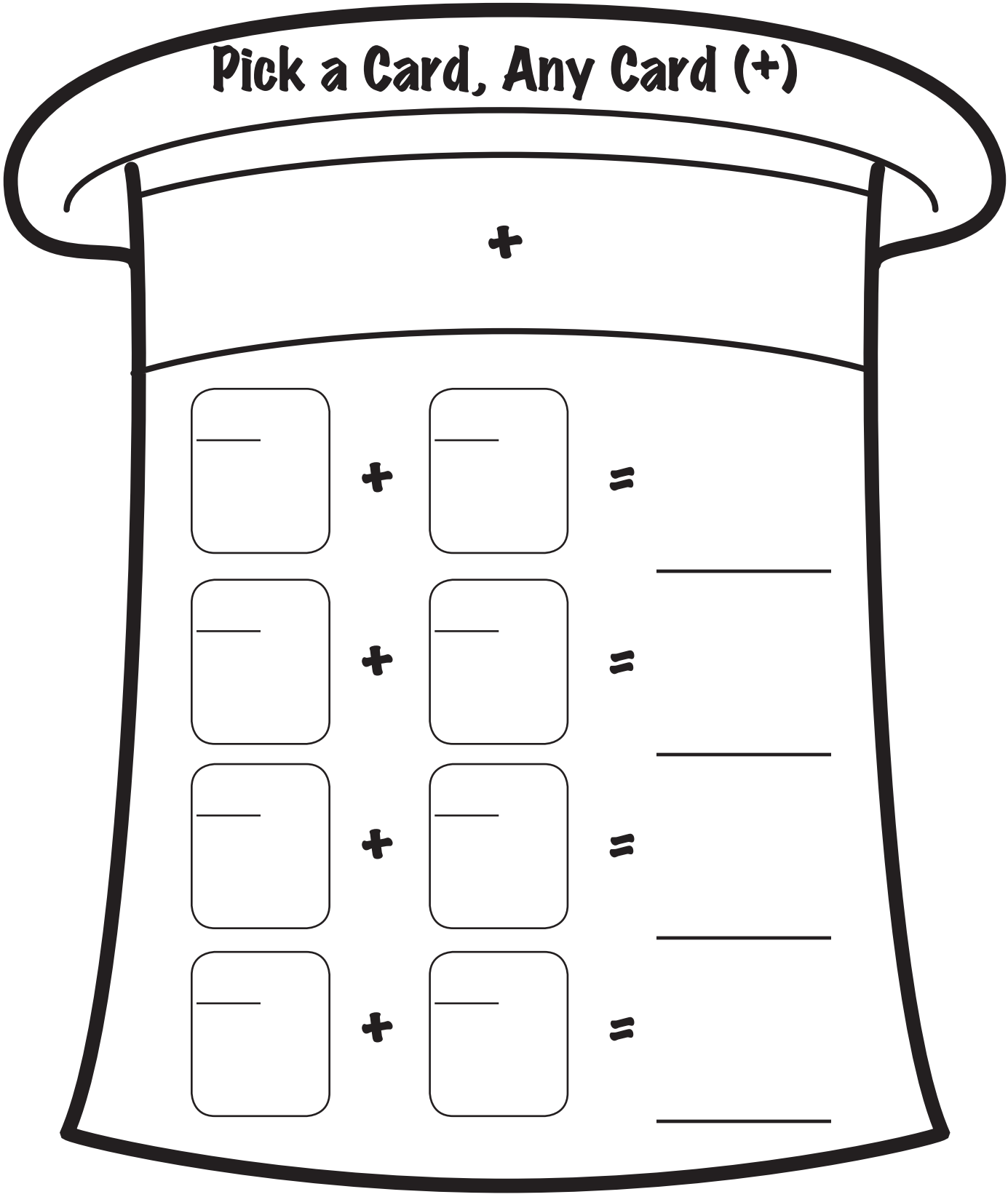

Magic Signs (-)
- =


Pick a Card, Any Card (+)
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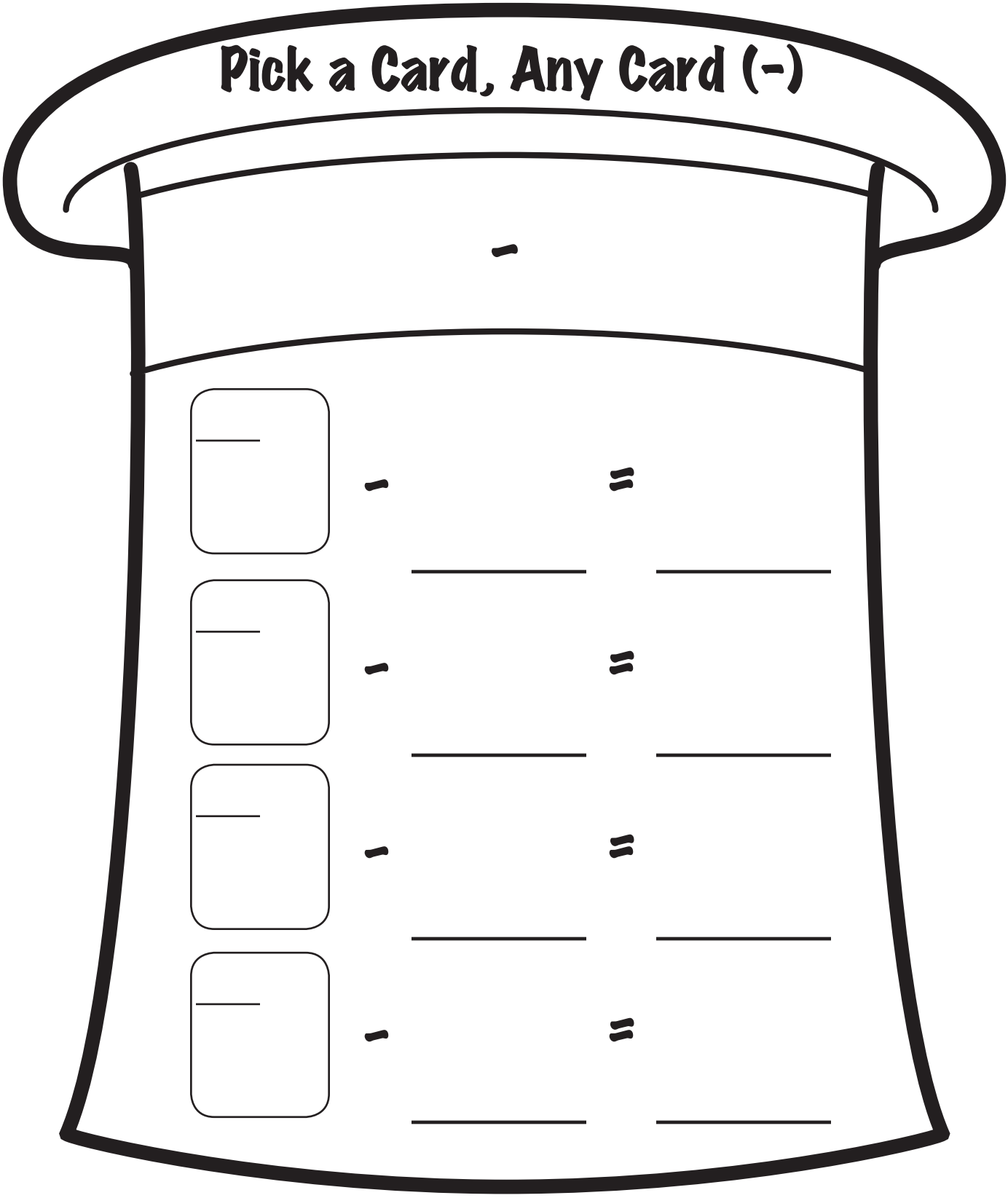
+ =
+ =
+ =
+ =


Pick a Card, Any Card (-)
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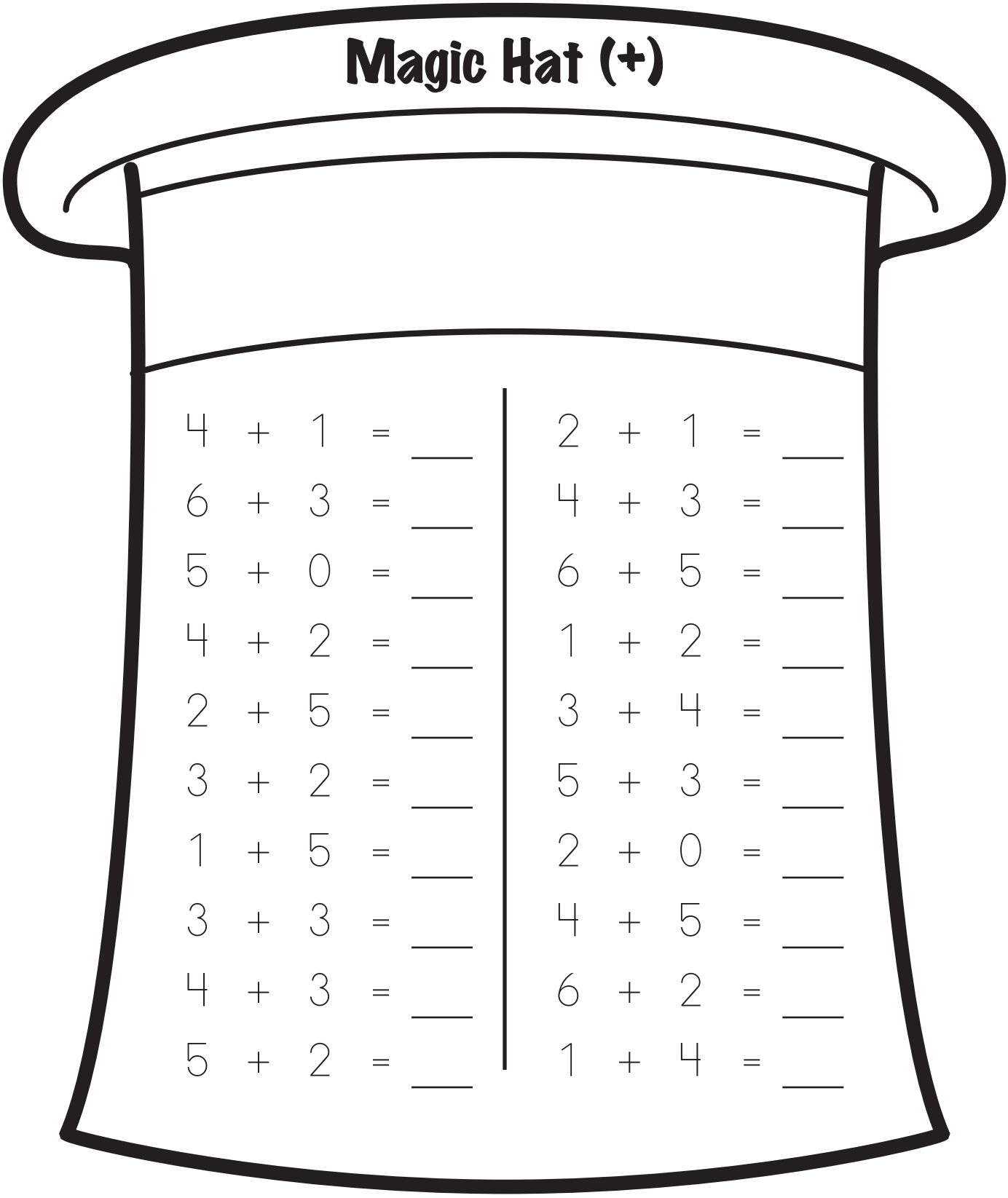
-
=

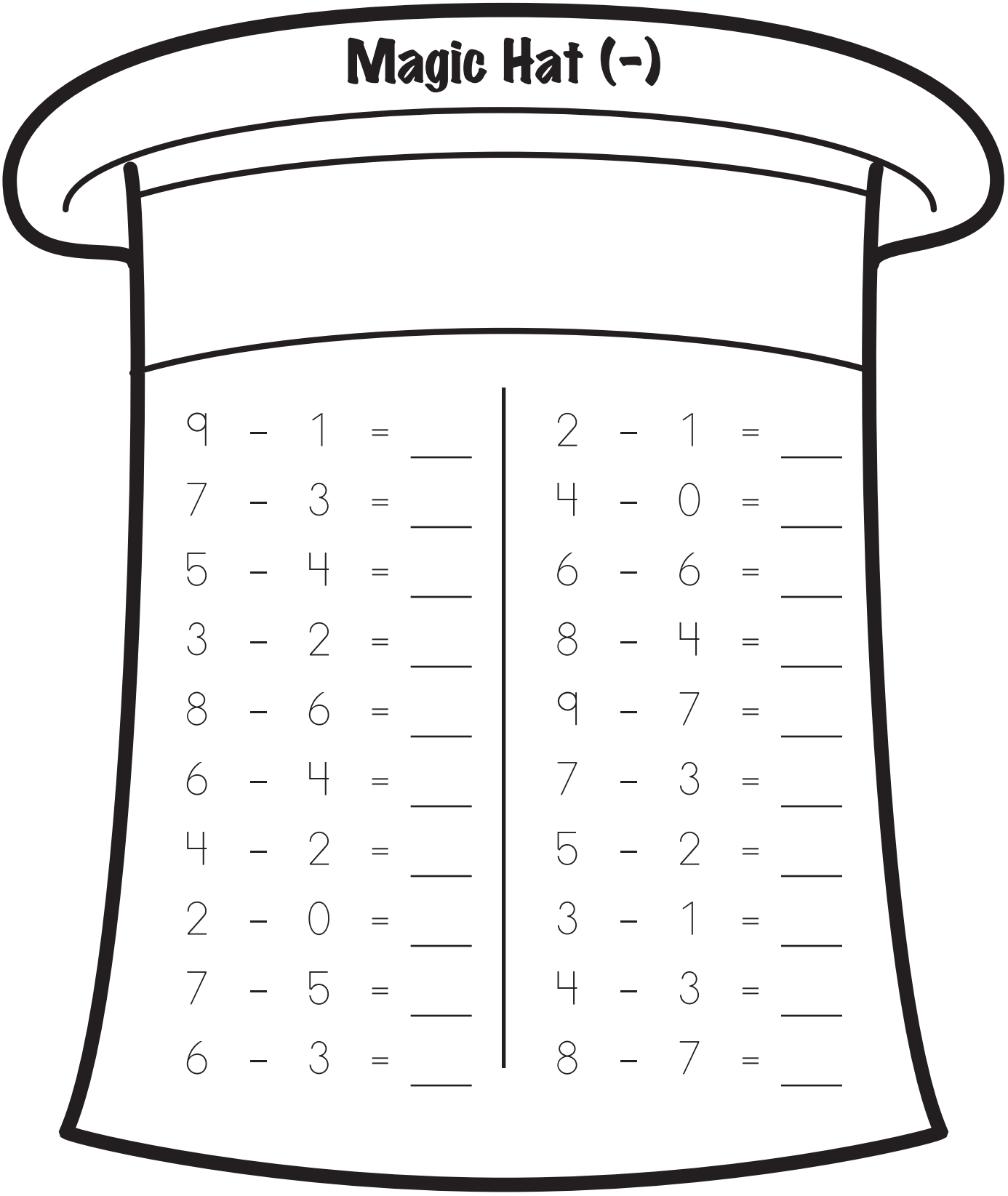

Magic Number Sentences

Magic Hat (+)



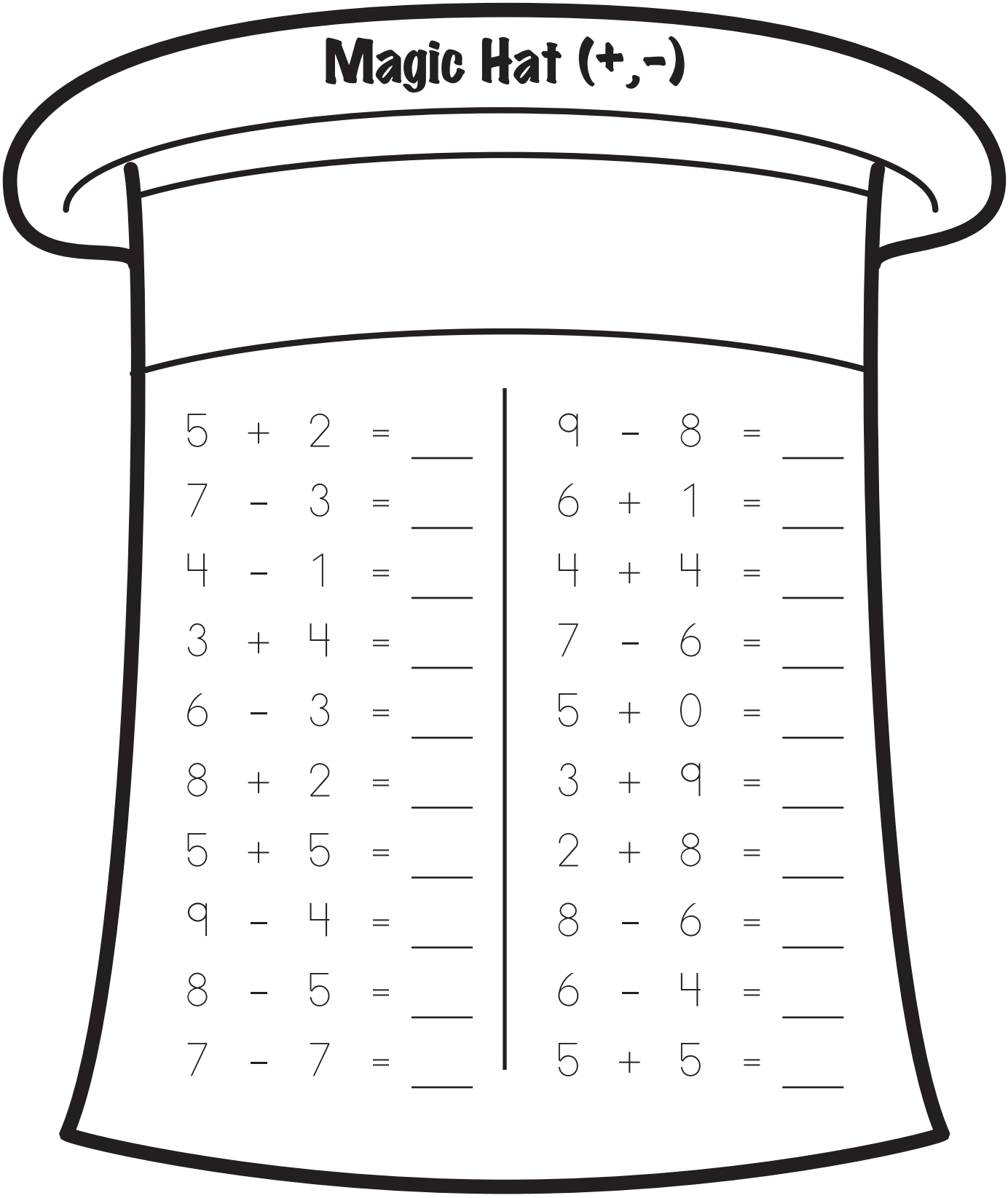
4 + 1 = ___	2 + 1 = ___
6 + 3 = ___	4 + 3 = ___
5 + 0 = ___	6 + 5 = ___
4 + 2 = ___	1 + 2 = ___
2 + 5 = ___	3 + 4 = ___
3 + 2 = ___	5 + 3 = ___
1 + 5 = ___	2 + 0 = ___
3 + 3 = ___	4 + 5 = ___
4 + 3 = ___	6 + 2 = ___
5 + 2 = ___	1 + 4 = ___

Magic Hat (-)



9 - 1 = ___	2 - 1 = ___
7 - 3 = ___	4 - 0 = ___
5 - 4 = ___	6 - 6 = ___
3 - 2 = ___	8 - 4 = ___
8 - 6 = ___	9 - 7 = ___
6 - 4 = ___	7 - 3 = ___
4 - 2 = ___	5 - 2 = ___
2 - 0 = ___	3 - 1 = ___
7 - 5 = ___	4 - 3 = ___
6 - 3 = ___	8 - 7 = ___

Magic Hat (+,-)



5	+	2	= ___	9	-	8	= ___
7	-	3	= ___	6	+	1	= ___
4	-	1	= ___	4	+	4	= ___
3	+	4	= ___	7	-	6	= ___
6	-	3	= ___	5	+	0	= ___
8	+	2	= ___	3	+	9	= ___
5	+	5	= ___	2	+	8	= ___
9	-	4	= ___	8	-	6	= ___
8	-	5	= ___	6	-	4	= ___
7	-	7	= ___	5	+	5	= ___

Magic Hat Worksheet

Problem Solving

1. Merlin pulled 6 rabbits from his magic hat, then he pulled out 2 more rabbits. How many rabbits did Merlin have in all? _____

2. Aladdin has 8 frogs in his magic hat, he took 3 frogs out of his hat. How many frogs are left in his hat?
   _____

3. 5 bunnies jumped into Merlin's hat, 2 frogs jumped in after the bunnies. How many animals did Merlin have in his hat?
   _____

4. Aladdin has 9 magic cards, he gave 4 cards to Merlin to use. How many cards does Aladdin have left?
   _____

5. 7 birds are in Merlin's magic hat, 4 were scared and flew away. How many birds are left in the hat?
   _____

Ways To Get To

A Family of Facts

Standard I:
Students will acquire number sense and perform simple operations with whole numbers.

Objective 3:
Model, describe, and illustrate the meanings of addition and subtraction and use these operations to solve problems.

Intended Learning Outcomes:
1. Demonstrate a positive learning attitude.

Content Connections:
Content 2-1; relationship to families

Math Standard I

Objective 3

Connections

Background Information

Students need to understand that addition and subtraction are inverse operations. That is, when you add numbers, you can then subtract those same numbers from the sum to show equality in the number sentence.

Research Basis

Hudson, P., Miller, S.P., (2006). *Designing and Implementing Math Instruction for Students with Diverse Learning Needs*. p.200-220.

Because of the hierarchical nature of mathematics, it is very difficult for students who lack competence in addition and subtraction to advance their mathematical ability. Understanding the relationship between addition and subtraction helps build declarative knowledge.

Miller, S.P., Hudson, P.J., (2006). Helping students with disabilities understand what mathematics means. *Teaching Exceptional Children,* Sept./Oct. 2006, Vol. 39. No.1, pp.28-35.

The importance of conceptual understanding of mathematics is explained in this article. Students that have developed a conceptual knowledge understand the deep meaning of abstract mathematical symbols and operations. Providing a variety of ways to represent concepts will encourage meaningful understanding and the students should be able to generalize the skill.

Invitation to Learn

Read *Family* poem by Mary Ann Hoberman. After reading the poem have students discuss what makes up a family. Then, using boy and girl figures, tell a story about your family. For example: I

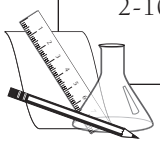
Materials
- ❑ *Family*
- ❑ Boy and girl figures

have five in my family. There is a dad (put a boy on board), A mom (put a girl on board), one brother (put another boy on the board), and two girls in my family (put two more girls on the board). This is how my family makes up five people. Leave your family representation on the board, and tell a story about a student in your classroom with a different number in their family. Then chose another student; one that has the same amount of people only with a different amount of boys and girls.

Instructional Procedures

Materials

- ❑ *My Family*
- ❑ Drawing tools
- ❑ Large numbers from 2-10

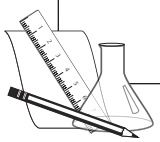


My Family

1. Give each student a copy of the *My Family* worksheet.
2. Instruct students to draw their family using their markers, crayons or colored pencils.
3. In the upper right hand corner of the paper, the students will write how many are in their family. They will also write how many boys and how many girls.
4. On the board, place large numbers from two-ten (Place numbers according to sizes of families. If you know your students do not have ten in their family, or if there are families with more, place that amount of numbers on the board.)
5. Students will take turns bringing their family pictures to the board and placing them under the number that they have in their family.
6. Explain to students that we have many different sizes of families.
7. Point out that a family of five might have two girls and three boys, or four boys and one girl, but it is still a family of five.
8. Go through the other numbers and point out the different combinations of boys and girls in a family.

Materials

- ❑ Sentence strips
- ❑ *Boy Die Cuts*
- ❑ *Girl Die Cuts*
- ❑ Pencils
- ❑ Glue sticks



Family Number Sentence

1. Demonstrate to students how to write a number sentence about your family. The number sentence will be illustrated with the *Boy and Girl Die Cuts* (e.g. 2+3=5 in my family, two boy die cuts are placed beside the number two and three girl die cuts are placed beside the number three.)
2. Give each student a sentence strip and *Boy and Girl Die Cuts*.

3. Students will now write their own family number sentence, gluing on die cuts to represent boys and girls in their family.
4. After students have completed their number sentences have them replace the pictures on the board of their families with their family number sentence.
5. Again point out the different combinations of boys and girls that equal five and the different combinations that equal six, etc.

House of …

Materials

- ❑ Chart paper
- ❑ Markers
- ❑ Boy and girl figures
- ❑ *House of… Journal*

1. On chart paper draw a large house and write the numeral one at the point of the roof, add a line to separate the roof from the house. Make sure students understand that a house of zero would be empty.
2. Explain to students that you are going to make a house of one.
3. Using boy and girl figures, show representations of ways to make one. (e.g. one boy or one girl)
4. Write number sentence on chart paper house. (1+0=1, 1-0=1)
5. Students will make their own Families of… in their *House of … Journal*. As you write the number sentences on the chart paper, students will write the number sentence in their journal.
6. On next large house write the numeral two at the point of the roof.
7. Explain that you are now making a house of two.
8. Using boy and girl figures, show representations of ways to make two. (e.g. two boys and zero girls, one girl and one boy, etc.)
9. Write number sentences (2+0=2, 1+1=2) on house.
10. Using story form, start by telling that there were two people in the house and one brother went to play with his friends, now there is only mom left at home. Show number sentences (2-1=1, 2-0=2)
11. Continue making Families of…through nine using all related math facts. (e.g.3+0=3, 2+1=3, 1+2=3, 0+3=3, 3-0=3, 3-1=2, 3-2=1, 3-3=0)
12. When incorporating the zero concept, you can simply state that all families are not alike, and in some families there might be all girls and no boys or visa versa.

Materials

- ❑ *Houses of…*
- ❑ Construction paper
- ❑ *Family Chain Pattern*
- ❑ Dry erase markers and erasers

Family Chain

1. Charts of *Houses of…* will be on the board.
2. Explain to students that we will now take a family from the *House of…* two.
3. Take out the *Family Chain*. This is a paper doll chain, with 5 people in the chain made from 12X18 construction paper.
4. On the head of the first person in the paper chain, write the number in your family. On one arm write the number of boys and on the other arm write the number of girls.
5. Explain to students that we now have the numbers needed to make a fact family. The fact family will have two addition problems and two subtraction problems.
6. Show students on the *Family Chain* the ways to make the fact family. On the second person, write the first addition fact. On the third person write the second addition fact. On the fourth person write the first subtraction fact, and on the fifth person write the second subtraction fact.
7. Students will now use their own *Family Chain*.
8. Have *Family Chains* already made and laminated.
9. Give each student a *Family Chain* and dry erase marker.
10. Tell them to take their own family from the house and show the facts that belong to their family.
11. After they have represented their own family, tell them to take another family from the house and show the facts that belong to that family.
12. Have students do at least one fact family from each house.

Materials

- ❑ Chart paper
- ❑ *Fact Family Triangles*
- ❑ *Fact Family - Roof Pieces*
- ❑ Containers

Fact Family Triangles

1. Using chart paper, draw a large house; in the roof write 3 numbers to use in number sentences that make up a fact family. As a class, develop the fact family number sentences and write them in the house. Practice until students see the pattern.
2. Give each student a copy of the *Fact Family Triangles* worksheet.
3. Sit students in groups to share the containers of the *Fact Family - Roof Pieces*. Students will work independently, by taking a roof piece and placing it on top of a house on the *Fact Family Triangles* worksheet, they will then write the addition and subtraction sentences that go with that fact family on their *Fact Family Triangles* worksheet.

4. After they have completed a fact family they will put the roof piece back in the container and take out another.
5. Students will continue to fill in each of the houses on their worksheet with different roof pieces.

Assessment Suggestions

- *Fact Family Triangles* worksheet
- Completion of *Families of… Journals*
- Use *Family Chains* to assess understanding of various fact families.

Curriculum Extensions/Adaptations/ Integration

- Advanced learners can develop problem solving questions about families.
- For advanced learners, put the numbers on the sides of the fact family triangles and then they chose the appropriate places for the numbers to go in the number sentences.
- Advanced learners can make their own fact family triangles and use them to make a game.
- Adaptations for learners with special needs would be to let the student use the die cuts to develop fact families.
- Another adaptation would be to, write one of the numbers in the fact family number sentences for the student.
- This activity could be used along with a unit on families.
- As a lesson in language arts, write about why the fact family numbers are together (focus on the patterns.)

Family Connections

- Take home *Family Chain* and have family help them make up a variety of fact families.
- Send home a blank *Fact Family Triangles* worksheet for the family to do. Write a letter asking parents to talk about relatives or neighborhood families and make their fact families like their relatives or neighborhood families.
- Have students teach their family how to make a fact family.

Additional Resources

Books

Love is a Family, by Roma Downey; ISBN 9780060393748

Web sites

http://www.haelmedia.com/basic_fact_sheets/index.html

http://www.quia.com/jg/387225.html

http://www.dositey.com/

http://www.canteach.ca/elementary/songspoems3.html (family poem)

FAMILY

What is a family?
Who is a family?
One and another makes two is a family!
Baby and father and mother: a family!
Parents and sister and brother: a family!

All kinds of people can make up a family
All kinds of mixtures can make up a family

What is a family?
Who is a family?
The children that lived in a shoe is a family!
A pair like a kanga and roo is a family!
A calf and a cow that go moo is a family!

All kinds of creatures can make up a family
All kinds of numbers can make up a family

What is a family?
Who is a family?
Either a lot or a few is a family;
But whether there's ten or there's two in your family,
All of your family plus you is a family!

Mary Ann Hoberman

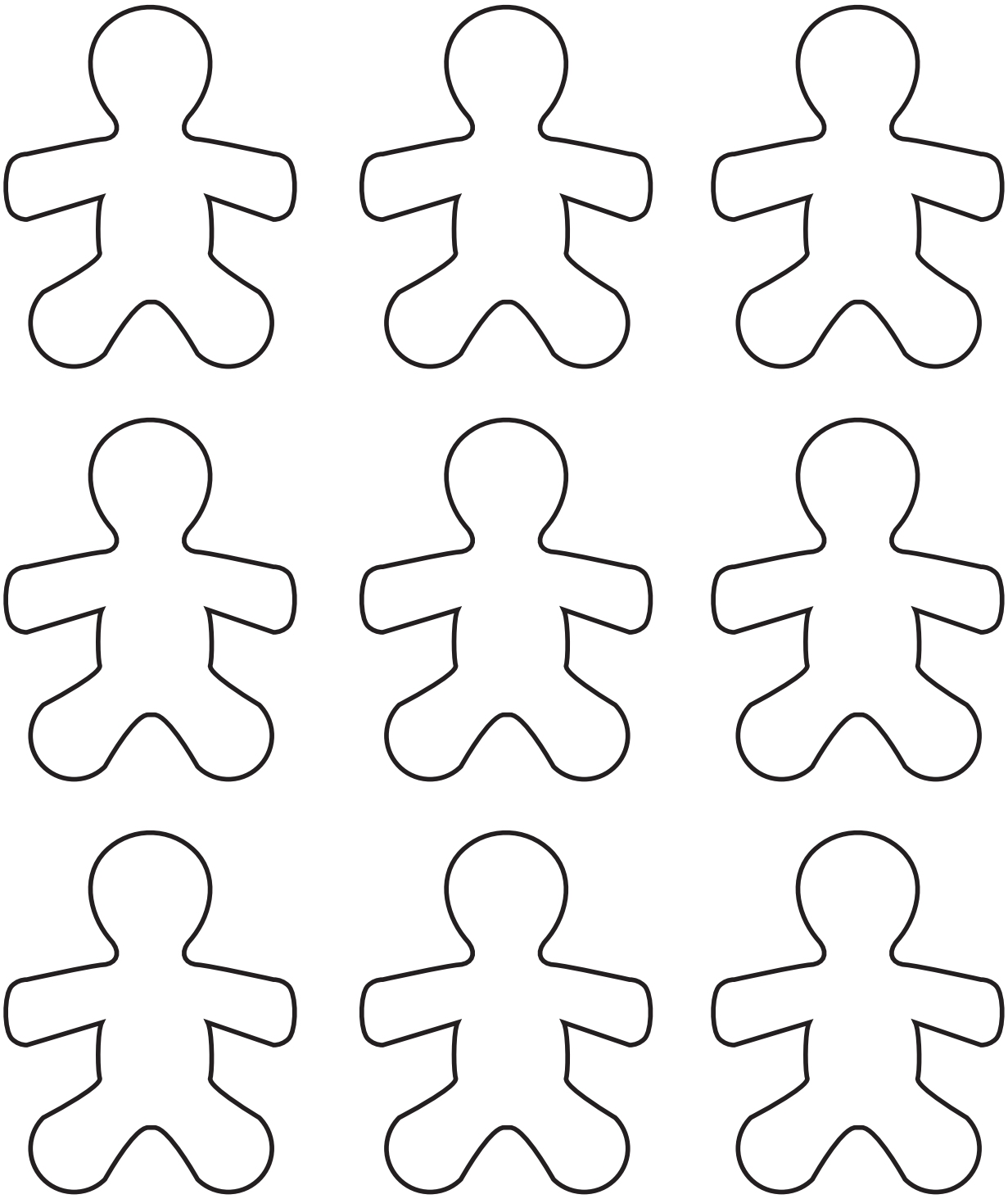
My Family

There are _____ people in my family.

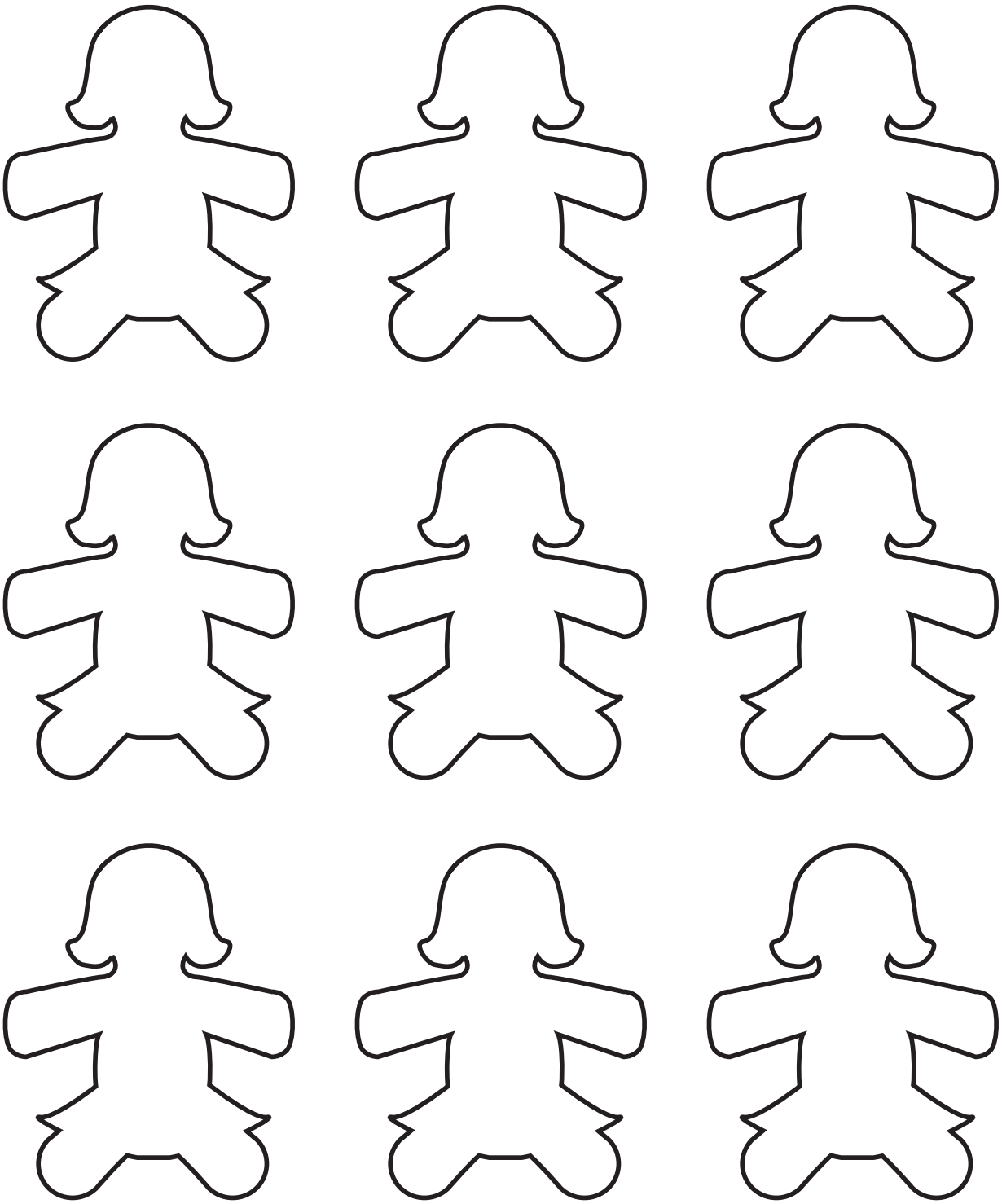
_____ boys

_____ girls

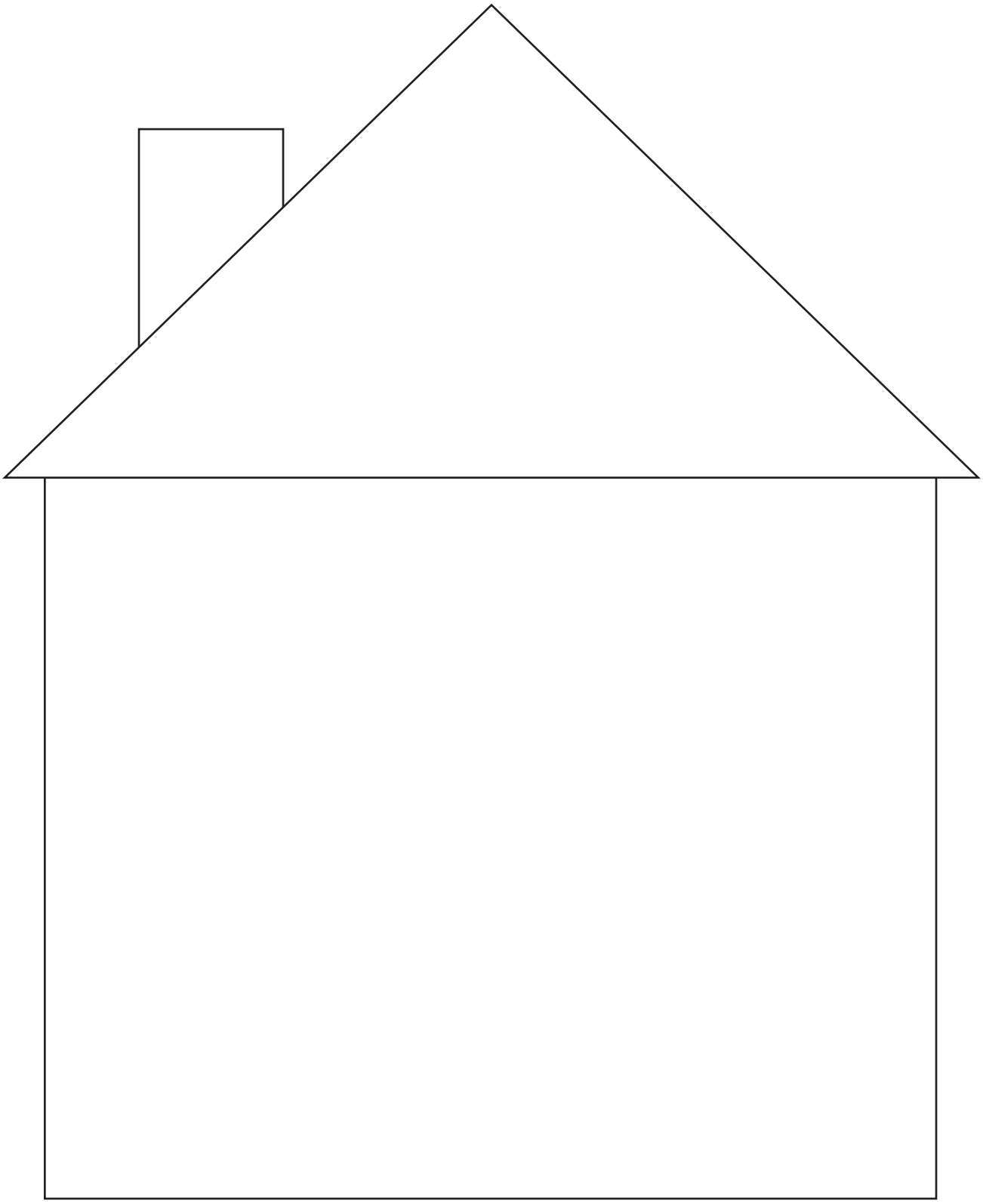
Boy Die Cuts



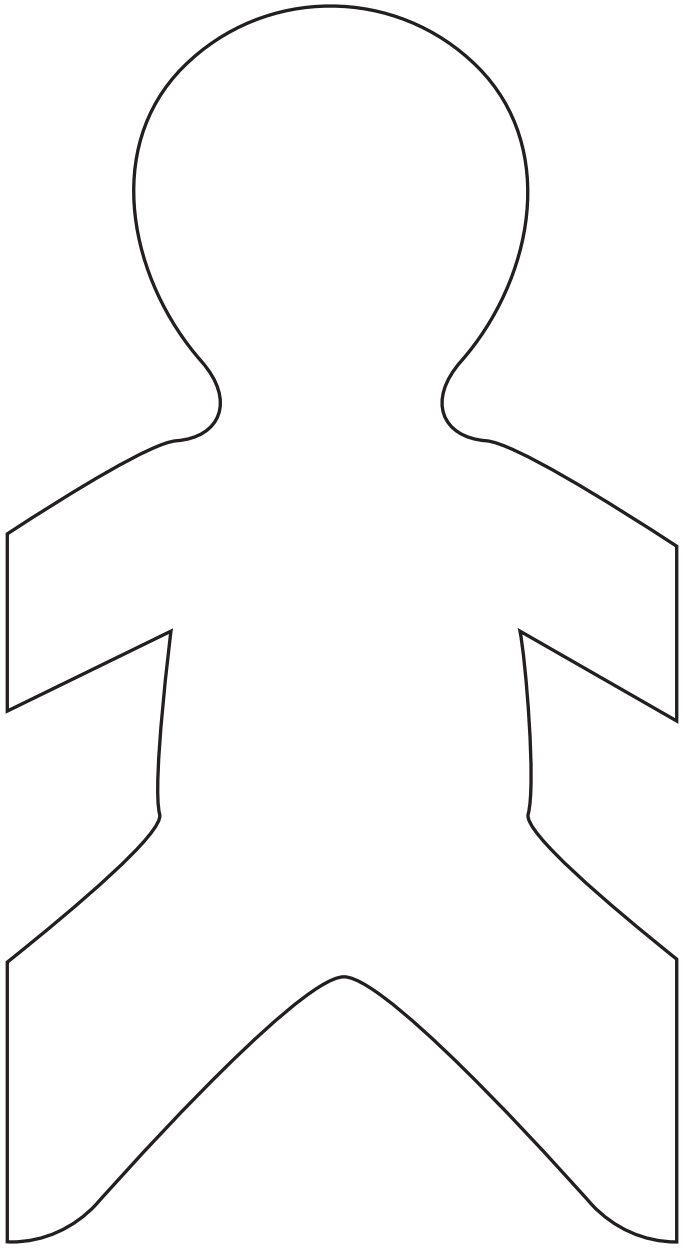
Girl Die Cuts



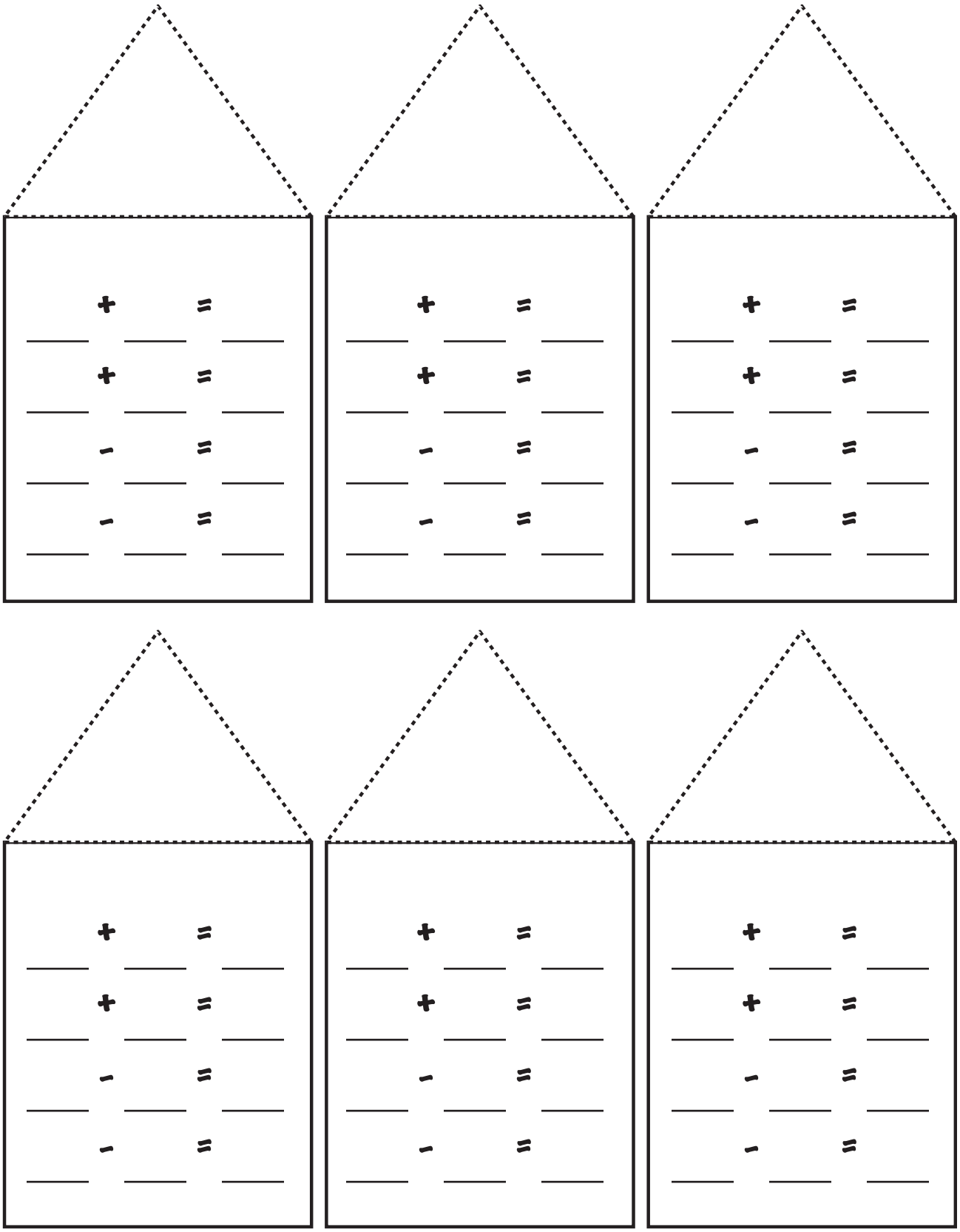
House of....



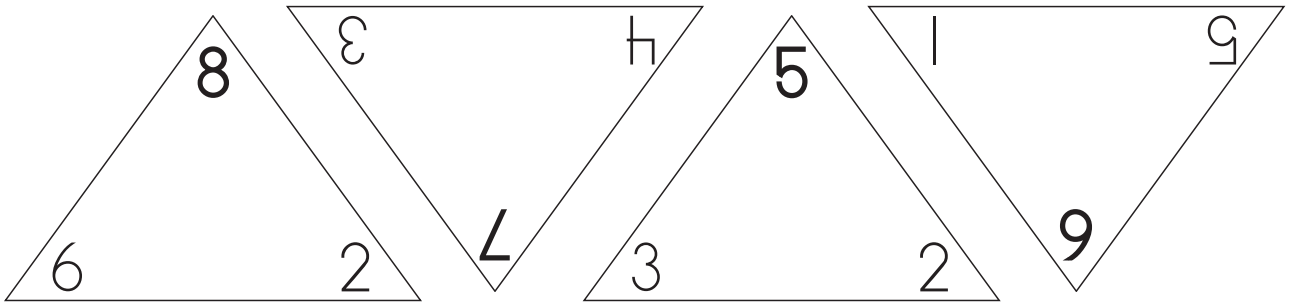
Family Chain Pattern

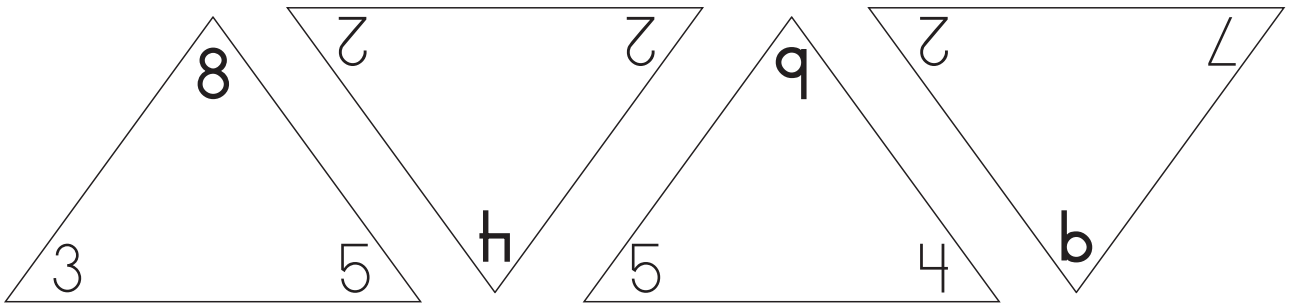


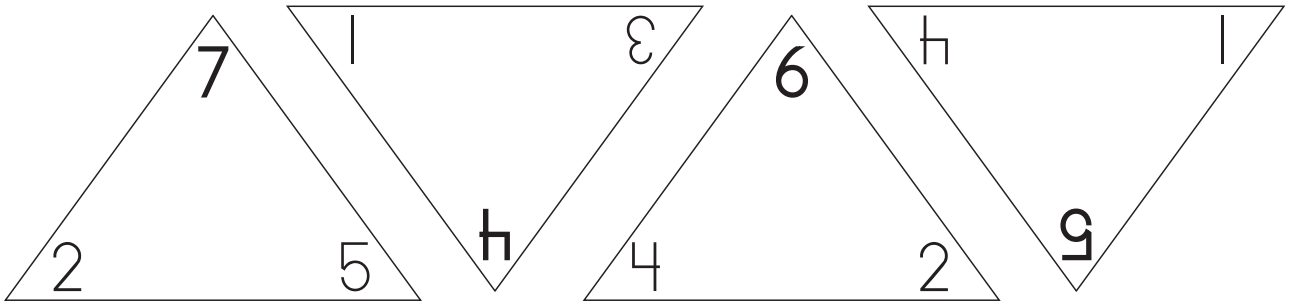
Fact Family Triangles

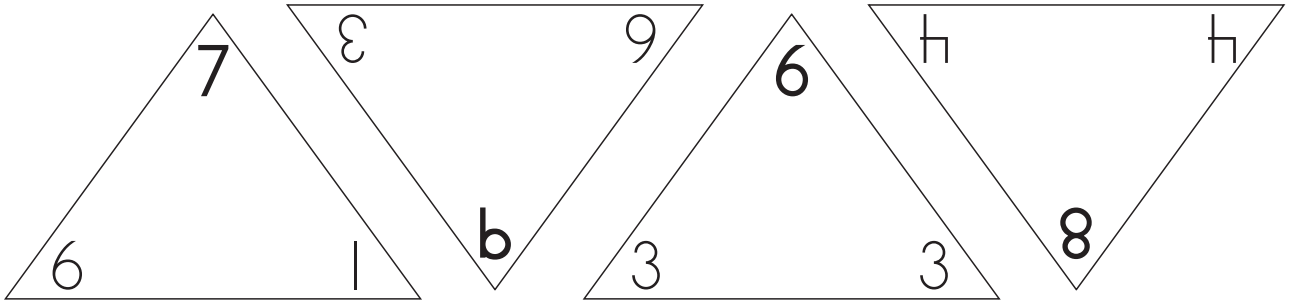


Fact Family Roof Pieces

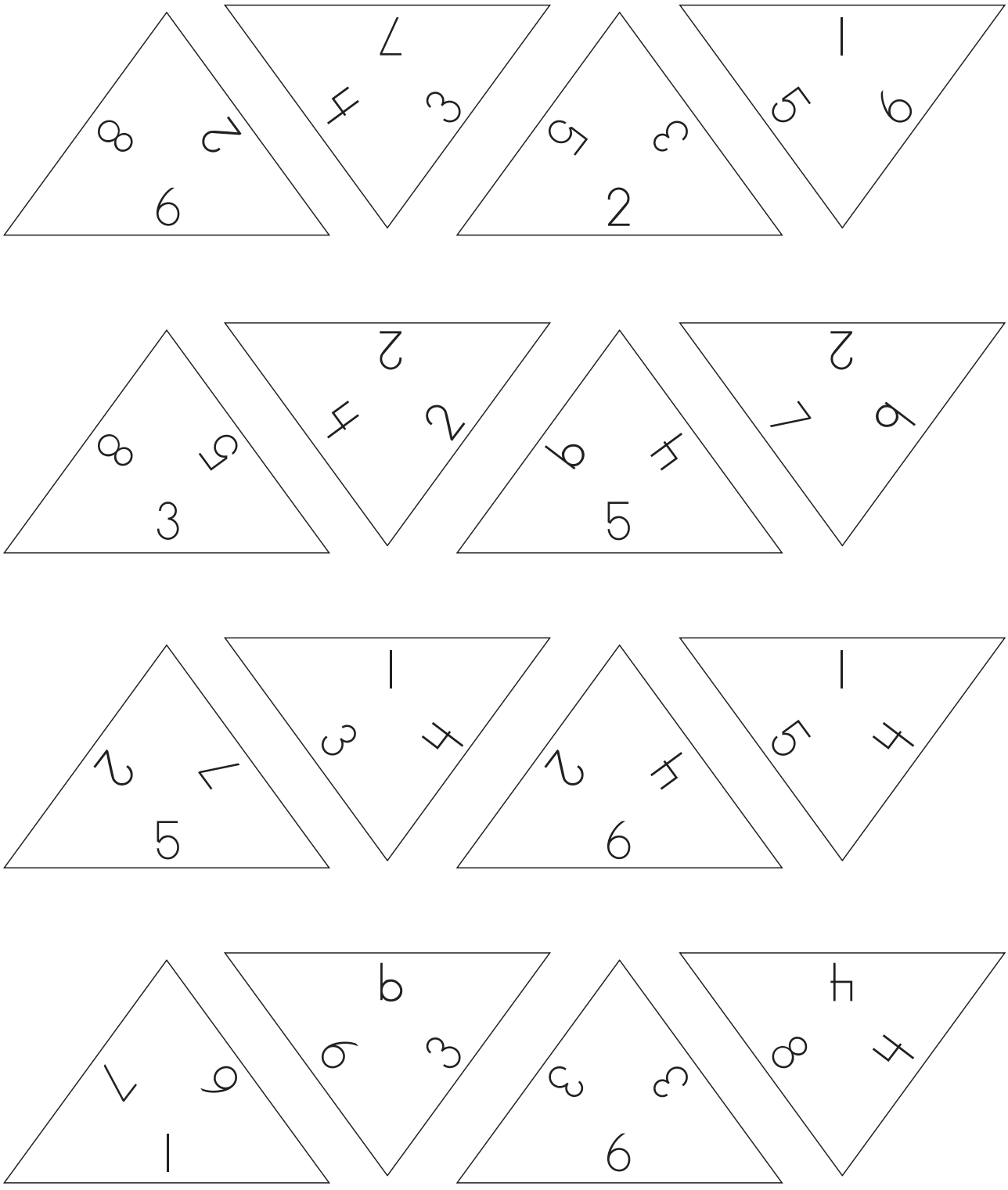




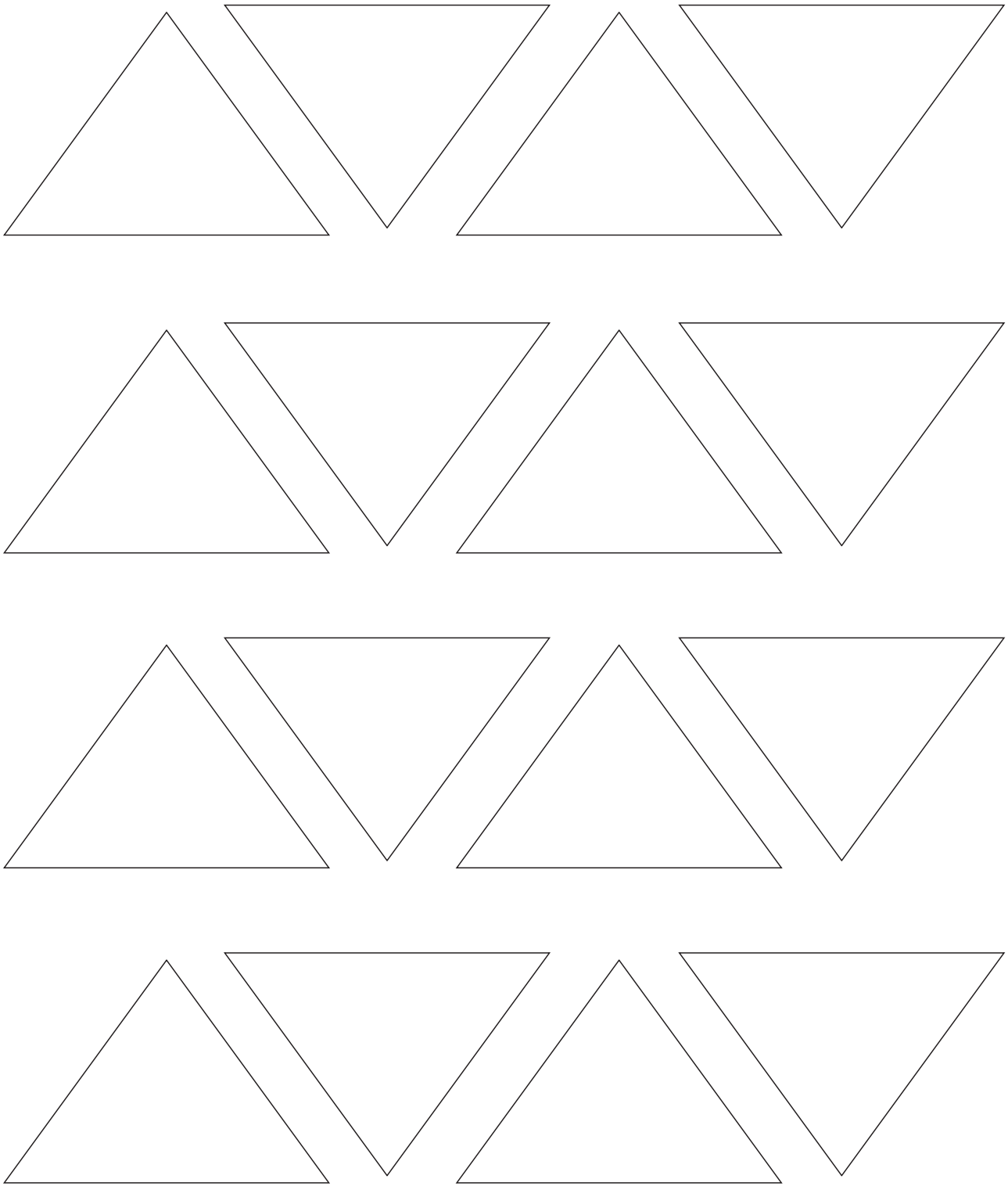




Fact Family Roof Pieces II



Fact Family Roof Pieces (Blank)



Content III-2

Activities

Water

Water is Special

Standard III:
Students will develop an understanding of their environment.

Objective 2:
Investigate water and interactions with water.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.

Content Connections:
Content II-3; Create visual art

Content Standard III

Objective 2

Connections

Background Information

This activity employs the use of anticipation guides as a teaching strategy. To prepare an anticipation guide teachers prepare a list of statements, about the topic, for students to discuss before reading or beginning the investigation. Some of the statements need to be true and some need to be false. This strategy can be used to activate background knowledge before reading or doing an activity, as well as to simulate interest, compare before and after decisions, reverse misconceptions, and assess students' understanding of new knowledge and/or skills.

Research Basis

Head M.H. , Readence J.E. (1986). Anticipation guides: meaning through prediction. In E.K. Dishner, T.W. Bean, J.E. Readence and D.W. Moore, (Eds.) *Reading in the Content Areas*.

Anticipation guides are used before and after reading in a context area or conducting an investigation. Inquiry connections using this technique include the application of new knowledge, citing evidence for decisions, and allowing students to debunk their own misconceptions and assess their own language.

Akerson, V.L., Hanusein, D.L. (2005) A collaborative endeavor to teach the nature of scientific inquiry, there's more to science than meets the "I". *Exemplary Science: Best Practices in Professional Development*. 1-10.

The authors found that when teachers were taught how to adapt curricula to emphasize inquiry and the nature of science, they were able to confront and change their own ideas of how science should be taught. They were better able to develop strategies for teaching science as inquiry while emphasizing the nature of science to their own students.

Invitation to Learn

Materials

- ❑ *I am Water*
- ❑ Chart paper

1. Anticipation Guide – This is an activity that allows you to asses what your students already know about water. Read the following statements to the children. Have them show thumbs up if they think the statement is correct; show thumbs down if the statement is incorrect. Record the number of students that agree with the statements and how many disagree. Do this for each statement. In order for the statement to be true all parts of the statement need to be true.

   Water is important for animals.

   Rocks need water.

   All living things need water.

   Water is for cooking.

   People do not need fresh water for drinking or cooking.
2. Read the book *I Am Water* by Jean Marzollo.
3. Review the statements. On chart paper, interactively write about why the statements are true or false.

Instructional Procedures

Materials

- ❑ *Water Alpha Box*
- ❑ *Water Alpha*
- ❑ Spaghetti noodles
- ❑ Kool-Aid
- ❑ Macaroni
- ❑ Dry cheese packet
- ❑ Jell-O
- ❑ Dinner plate
- ❑ Clear drinking cup
- ❑ *Water is Special*

1. Divide your class into groups and give each group a *Water Alpha Box* graphic organizer. Have each group fill in each box with at least one water word that corresponds with the letter on the graphic organizer.
2. Place the *Water Alpha Box* poster at the front of the room. Have each group share words from their list to complete the class graphic organizer.
3. Keep the *Water Alpha Box* displayed for the remainder of the water unit.
4. Show the students a plate with uncooked macaroni noodles sprinkled with cheese, Jell-O powder and uncooked spaghetti noodles. In a clear drinking glass, empty a packet of Kool-Aid powder. Point to the spaghetti and ask, "What is this? (Spaghetti). "Would you like to eat it?" "What does the spaghetti need to make it edible/something you would want to eat?" (to be cooked).
5. Point to each of the other items and ask the same questions.
6. On a dry erase or white board write: Spaghetti, Jell-O, Macaroni and Cheese, Kool-Aid

7. Ask, "What does a person need to cook spaghetti? Write the word "water" under "spaghetti" on the board. Ask the same question for the remaining foods and write water under each word. Tell the students that water is important when preparing food. Discuss other things that water is important for. (For example, cleaning, drinking, having fun)
8. Teach the song *Water is Special*. (Sing to the tune, *London Bridges Falling Down*)
9. Put the children in groups and have them create a new verse to the song. Let the children refer to the *Water Alpha Box* if they need ideas.
10. Share the new verses to the song.

Assessment Suggestions

- Have the students draw or write one way we use water for each of the following; drinking, cleaning and having fun.
- Have the students play water charades. Assess whether the students can correctly think of a water word from one of following categories to act out: cleaning, cooking or having fun. If they need assistance have them use the words from the *Water Alpha Box* graphic organizer.
- Invite students to create a poster, advertising the importance of water.

Curriculum Extensions/Adaptations/ Integration

- Have the students illustrate the verses of the song *Water is Special*. Put one line from the song on each page and have the students illustrate each page, creating a class big book of the song, *Water is Special*.
- Have the students read and act out the song for Readers' Theater.
- Give the students paint brushes, paper and dry tempera paint. Ask them to paint a picture. Point out that they need water in order to paint. Add water and have them paint.
- Have the students create their own anticipation guides about water and its uses. The students can then quiz each other.

Family Connections

- Have the students keep track of how water is used to prepare their dinner.
- Have the students take home the anticipation guides they created in class and use them to teach their families what they've learned about why water is special.
- Have the students create a bingo card using pictures of how we use water in our homes. While at home have them color a bingo square each time they use water in one the ways on their bingo card. When they get bingo, they can return their card to school for a reward.

Additional Resources

Books

I am Water, by Jean Marzollo; ISBN 0-590-26587-3

A Drop of Water, by Walter Wick*; ISBN 0-590-22197-3*

Water, Water Everywhere, by Joan Wade Cole and Karen K. Welch*; ISBN 0-8332-1126-9*

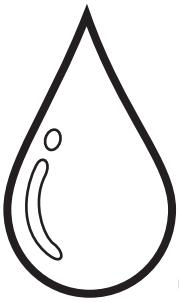
Water Dance, by Thomas Locker; ISBN *0-15-201284-2*

Web sites

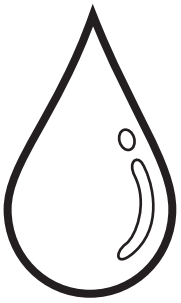
http://www.ga.water.usgs.gov/edu/helptopics.html

http://www.water.usgs.gov/outreach/OutReach.html

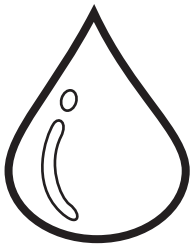
Water Alpha-Box	A	B
C	D	E
F	G	H
I	J	K
L	M	N
O	P	Q
R	S	T
U	V	W
X	Y	Z



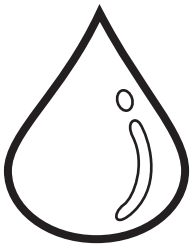
Water Is Special



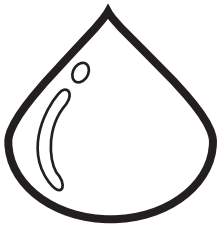
(sing to the tune of London Bridges Falling Down)



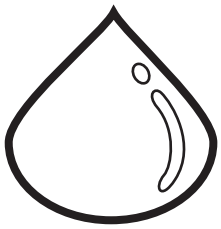
Water is in drippy drops,
Water is in soapy mops,
WATER IS SPECIAL.

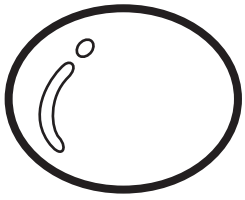


Water fills in swimming pools,
Water fills fishes schools,
WATER IS SPECIAL.

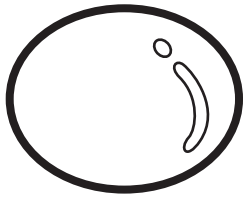


Water makes spaghetti floppy,
Water makes puddles sloppy,
WATER IS SPECIAL.





Water keeps us all alive,
It's necessary to survive,
WATER IS SPECIAL.



I am a Scientist

Standard III:
Students will develop an understanding of their environment.

Objective 2:
Investigate water and interactions with water.

Intended Learning Outcomes:
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Language Arts: VIII-6; Produce personal writings

Content Standard III

Objective 2

Connections

Background Information

The Science process occurs naturally, spontaneously in our minds. By logically breaking down the steps in our thinking, we can use science process to find out how to answer our questions about how the world works. The science process is not just useful in science, but in any situation that requires critical thinking. The science process skills include observing qualities, measuring quantities, sorting/classifying, inferring, predicting, experimenting, and communicating. The following lesson will teach the students how to use the scientific method in conjunction with the science process skills. When the students are asking questions and forming hypothesis they will be using the skill of predicting. They will be experimenting and communicating during the experimenting step. When they write and draw observations, they are observing qualities, measuring quantities, and sorting/classifying. When forming conclusions the students are inferring. Finally, when the students share and discuss they are communicating.

Research Basis

Bricker, P. (November 2002). Reinvigorating science journals, *Science and Children*. 24-29.

In this article the author was invited to participate in a grant project focused on integrating science and literacy. Several grades were observed during the project, and the author found that it is important to use literacy when teaching the scientific process and that journaling plays an important role.

Livingston, C. (November/December 2005). Journals of discovery, *Science and Children*. 52-55.

While using Discovery Journals is her classroom, the author found that student learning is enhanced and the amount of knowledge that

is retained over time is increased. By using integrated Discovery Journals, the author was able to see valuable insights into her teaching, reflect how engaged students were in learning a particular topic, and determine how successful or unsuccessful she was in portraying a particular science concept.

Invitation to Learn

Materials

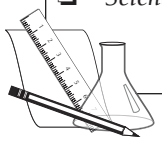
- ❑ *What is a Scientist*
- ❑ Bolded words

1. Ask the students who can be a scientist? Can only boys or girls be a scientist?"
2. Read the book "*What is a Scientist"* by Barbara Lehn and discuss each of the pictures.
3. Tell the students that you are going to make a class book similar to the one you just read. With a partner, the students will illustrate a picture that represents a page from the book.
4. Pass out paper to each of the partnerships that have the bolded words from each page of the book written at the top.
5. When students have completed the task, have them share with the class. After binding the book, have it available for the students to read.

Instructional Procedures

Materials

- ❑ *Scientific Method*
- ❑ *Scientific Method poster*



1. Tell the students that they are going to be Hydrologists (scientists that study water).
2. Explain to the students that, as you read in *What is a Scientist?,* there is a process that all scientists use to gather information and learn new things. This is called the Scientific Method. First, they need to ask a question. Next, they need to form a hypothesis (A hypothesis making a guess about what you think will happen. It may or may not end up being correct). Then they need to test their hypothesis by performing an experiment. They will observe the experiment and write and draw what they see. Last they will form a conclusion and then share and discuss their results with others (A conclusion is when we come to a final idea about what happened).
3. Give the students their *Scientific Method* graphic organizer and tell them that they will be using their journals through each step of the process while conducting water experiments.

4. Display the poster size *Scientific Method* graphic organizer. Explain the format of the *Scientific Method* graphic organizer. Each step of the process has an icon and words that explain what to do and explain what they need to write or draw. The students will use the boxes next to the icon to write or draw in (the teacher will use the poster size *Scientific Method* graphic organizer throughout the first experiment while the students use theirs).
5. Conduct the first experiment as a class to guide them through the process (this can be done with any kind of science experiment).

Experiment # 1 Water Break Down

Materials

- ❏ *Scientific Method*
- ❏ Wax paper
- ❏ Eyedroppers
- ❏ Toothpicks
- ❏ Water
- ❏ Liquid dish soap

Question: How does water break apart?

a) Have the students write this question on their *Scientific Method* graphic organizer next to the *question mark icon*.
b) Have the students discuss with a partner how they think this happens. Have them record their hypothesis next to the *light bulb icon*.
c) Give each child a square of waxed paper, an eyedropper, a toothpick and a small cup of water. Have the students drip several drops of water on the waxed paper. Use the toothpick and poke the drops of water.
d) Have the students record what happened by writing or drawing what they did next to the *beaker icon*.
e) Give the students a drop of liquid soap. Have them dip their toothpick into the soap and poke their water drops.
f) Use pictures or words to record their observation next to the *glasses and clipboard icon.*
g) Have the students come to their own conclusions and record it next to the *person thinking icon.*
h) Have the students get in groups to share and discuss what they observed and the conclusion they came to.
i) Write and additional information next to the *people talking icon.*

6. Explain to the students that they will be able to practice the Scientific Method by performing additional experiments. They will be working in groups and will use their graphic organizer the same way you just did as a class.

Materials

- ❑ *Scientific Method*
- ❑ Water bottles
- ❑ Mineral oil
- ❑ Food coloring
- ❑ Water

7. At each water station, post the question that needs to be answered by performing the experiment.
8. Divide the students into groups, explain the experiments and conduct the experiments.

Experiment #2 - Go With the Flow

Question: What will happen if I mix oil and water?

1) Fill 4-6 empty water bottles ¼ with mineral oil.
2) Add three drops of food coloring.
3) Fill the rest of the bottles with water.
4) Spin the bottles slowly, quickly and then shake them.
5) Record information on graphic organizers
6) Discuss and share as a group.

Materials

- ❑ *Scientific Method*
- ❑ Large container
- ❑ Small container
- ❑ Food coloring
- ❑ String

Experiment #3 - On the Move

Question: Why is my soup hotter at the top of my bowl when I take it out of the microwave?

1) Fill a large, clear, plastic container with cold water.
2) Fill a smaller clear, plastic container with hot water.
3) Add two drops of food coloring to the hot water.
4) Tie a string to the neck of the smaller container and lower the smaller container of hot water into the large container.
5) Watch as the hot water is dispersed into the cold water.
6) Record information on graphic organizer.
7) Discuss and share as a group.

Materials

- ❑ *Scientific Method*
- ❑ Coffee filters
- ❑ Washable marker
- ❑ Eyedroppers

Experiment #4 - A Rainbow of Colors

Question: Can water make colors change?

1) Give each student a coffee filter, water dropper, and a black watercolor marking pen.
2) Have the students make a black dot in the middle of the coffee filter.
3) Using the water dropper, drip one drop of water on the black dot.
4) Record information on graphic organizers.
5) Discuss and share as a group.

Materials

- ❑ *Scientific Method*
- ❑ Clear cup
- ❑ Comic strip

Experiment #5 - Crazy Comics

Question: Can water make pictures move?

1) Give each child a clear glass of water.
2) Put a comic strip behind the glass of water.
3) Make observation
4) Put the comic strip under the glass of water.
5) Make observation.
6) Record information on graphic organizers.
7) Discuss and share as a group.

Assessment Suggestions

- Use the *Scientific Method* graphic organizers for assessment.
- Have the students play concentration, matching the science process steps phrases and icons.
- Observe the students as they are completing the experiments.
- Create interview questions to see is they students can demonstrate or verbalize doing each step of the science process.

Curriculum Extensions/Adaptations/ Integration

- Using coffee filters, give the students a variety of watercolor markers and have them create designs on the coffee filters. Have them drop water on the colors. Create an art project with the coffee filters.
- Have the questions pre-typed onto the *Scientific Method* graphic organizer.
- Compile all the *Scientific Method* graphic organizers into a science journal.
- Allow students to draw pictures instead of writing on the *Scientific Method* graphic organizer.

Family Connections

- Give the students a copy of the *Scientific Method* graphic organizer. Have them conduct one of the experiments at home with their family and show them how to use the organizer.
- Invite parents to come to school and help with the experiments.

Additional Resources

Books

What is a Scientist, by Barbara Lehn; *ISBN 978- 0761312987*

Let's Try It Out in the Water, by Seymour Simon and Nicole Fauteux; *ISBN 0-439-40914-4*

Splish, Splash, Science, by Rebecca Olien; *ISBN 0-590-1595-2*

The Snowy Day, by Ezra Jack Keats; *ISBN 0-670-86733-0*

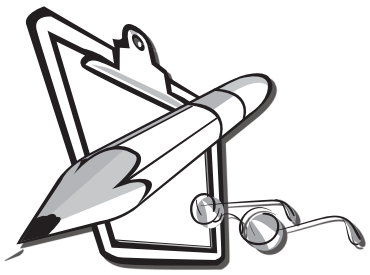
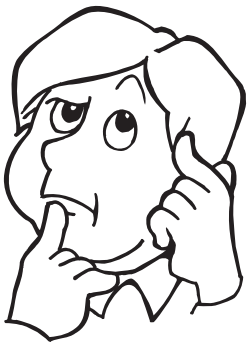
Web sites

http://www.epa.gov.IOGWDW/kids/exper./html

http://www.brainpopjr.com

Scientific Method

1.  Question	
2.  Hypothesis	
3.  Experiment	

4.  **Write & Draw Observations**	
5.  **Conclusions**	
6.  **Share & Discuss**	

Water Breakdown

How does water break apart?

Go with the Flow

What will happen if I mix oil and water?

On the Move

Why is my soup hotter in my bowl when I take it out of the microwave?

A Rainbow of Colors

Can water make colors change?

Crazy Comics

Can Water make pictures move?

Math I-2

Activities

Whole Number Relations

Bear Time

Standard I:
Students will acquire number sense and perform simple operations with whole numbers.

Objective 2:
Identify simple relationships among whole numbers up to 100.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.

Content Connections:
Content II-2; Strengthen community and cultural relationships

Math Standard I

Objective 2

Connections

Background Information

Before starting these activities, students need to be able to count to 100 and understand vocabulary terms such as greater than, less than, equal to, more, and less. Previous exposure to a hundreds chart would be helpful.

An important component in any good lesson is student engagement. To encourage this, the cooperative learning strategy, Think-Pair-Share, has been incorporated. Think-Pair-Share begins with the teacher posing a question or task and each student thinking about or working on it individually. Then the students turn to a partner and share their thinking. Their answers then can be shared with the whole group or a dyad can be formed to discuss further. Thoughtful and intentional pairing will provide avenues for effective differentiation.

Research Basis

Tomlinson, C. (September 2000). Reconcilable differences? Standards-based teaching and differentiation. *Educational Leadership*. 58(1)6-11.

Differentiated instruction involves teachers planning instruction based on student characteristics. This can be the student's readiness, interest, and/or learning profile. Differentiation also involves modifying the content, the process, or the product. By modifying instruction in these ways, students will all be exposed to the curriculum, but in ways that better meet their individual needs.

Lyman Jr., F. & McTighe, J. (April 1988). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*. 45(7)18-24.

Using the cooperative learning technique, Think-Pair-Share, allows students the opportunity to have time to think in a less competitive environment. It also lets the teacher cue student thinking through appropriate questioning and can improve student achievement and attitude.

Invitation to Learn

Materials

- ❑ *Number Crew: Dancing Bear Video*

Begin by watching, *Number Crew: Dancing Bear*. During viewing, have students Think-Pair-Share during the discussion sections in the film about what room the number crew should visit.

Instructional Procedures

Materials

- ❑ *Hiding Animals*
- ❑ Hundreds board pocket chart
- ❑ *Bear Squeeze*

Hidden Animals

1. Before beginning, hide the animals, from *Hiding Animals,* behind certain numbers on the hundreds chart. You will need to decide before each round which animal you are going to help guide them to find.
2. Have students join you on the rug and explain that they are going to help find the animals hiding on the hundreds chart.
3. Call on a student to pick a number. Based on what animal you want them to find, move the *Bear Squeeze* accordingly.
4. Keep calling on students to pick a number, moving the bears to help them narrow down what number the animal is hiding behind.
5. As the students get closer to narrowing down the number have them Think-Pair-Share what the possible solutions are.
6. Keep playing until the animal has been found.
7. Repeat until all animals have been found.

Materials

- ❑ *More or Less*
- ❑ *Hundreds Board*
- ❑ Scissors
- ❑ Glue
- ❑ Tape
- ❑ *Bear Squeeze*
- ❑ Teddy bear counters

Bear Squeeze

1. Read the story, *More or Less,* stopping throughout to have students figure out the possible number solutions based from the questions that Eddie asks. (You may want to list the numbers on the whiteboard and mark them off to help students keep track.)
2. Give each student a cardstock copy of the *Hundreds Board.*
3. Have them cut off the extra paper at the top, bottom, and right side of the chart.
4. Next, have students glue the *Hundreds Board* so that the number 10 and 11 match up and 20 and 21 and so on. It will form a cylinder.
5. Have students cut on the solid lines under each row of numbers, starting at one.

6. Put up the number line on the board and have students join you on the rug.
7. Explain to students that you are thinking of a number on the number line, a mystery number, and their job is to find it by asking questions similar to the ones Eddie asked in the book.
8. Call on a student to ask a question about the number.
9. Use the *Bear Squeeze* bears to show if the number is more or less than the number the student asked about.
10. As students get closer to the number, list on the board the possible solutions left and cross off as you play.
11. Continue playing until students have found the mystery number.
12. Repeat the game as long as there is student interest.
13. Pair up students to play Bear Squeeze in partners.
14. In their math journals, have students record their mystery number and have them track with tally marks how many questions it takes for the number to be found. Then using teddy bear counters and their paper number line have students ask their partner questions until they have found the mystery number.
15. Have students take turns and play each role at least twice.
16. When finished playing, have students write in their journals about what they have learned from playing *Bear Squeeze*.

Assessment Suggestions

- Informal observations can be made during the discussion of the *Dancing Bear* video.
- Divide the class into groups of three or four students and have them solve mystery numbers following clues that are given. An example set of clues could be: More than 30; less than 40; more than 32; less than 37; the digits add to 8. Give each group a different set of clues and have them work together to solve the mystery number.
- Observe while students play the *Bear Squeeze* in partners and make note of individual student understanding or misconceptions.
- Evaluate their math journal entry, from the *Bear Squeeze*, to check for understanding and use of vocabulary like more, less, greater than, less than, equal to, etc. Refer to *Bear Squeeze Checklist* to help evaluating journals.

Curriculum Extensions/Adaptations/ Integration

- As a class, give clues for a specific number. (For example: "More than 30; less than 40; more than 31; less than 37; the digits add to five.) Give the class the first two clues and have them write down all the possible numbers in their journal. One by one, give the other clues. Have each student cross out numbers that are no longer possible until they find the secret number.
- To simplify the Bear Squeeze game use a number line that only goes from 0-20.
- Give half of the students a number and create a human number line. On sentence strips, write things like greater than eight, less than ten, and greater than two and less than six. Then have the students in the number line step forward if they meet the criteria on the sentence strip. Have the other half of the class try and figure out what the sentence strip stated by analyzing what numbers stepped forward.

Family Connections

- Send home the *Mystery Number-Clue Sheet* to have students write their own clues for a mystery number to present to the class.
- Send home the *Bear Squeeze* bears and a paper number line and have students play at home with family members.

Additional Resources

Books

More or Less, by Stuart J. Murphy; ISBN 0-06-053167-3

100 Days of Cool, by Stuart J. Murphy; ISBN 978-0-06-000123-0

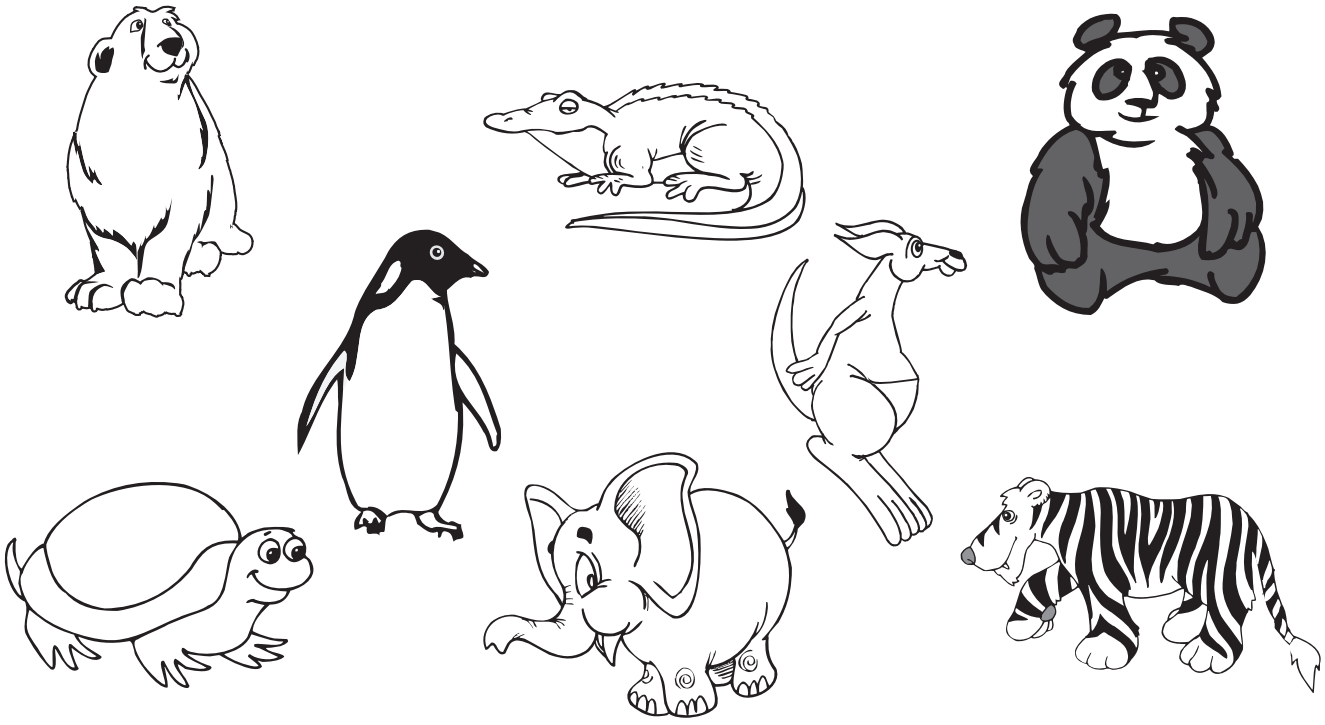
Media

Number Crew: Dancing Bear, http://www.uen.org/dms (emedia is available following login)

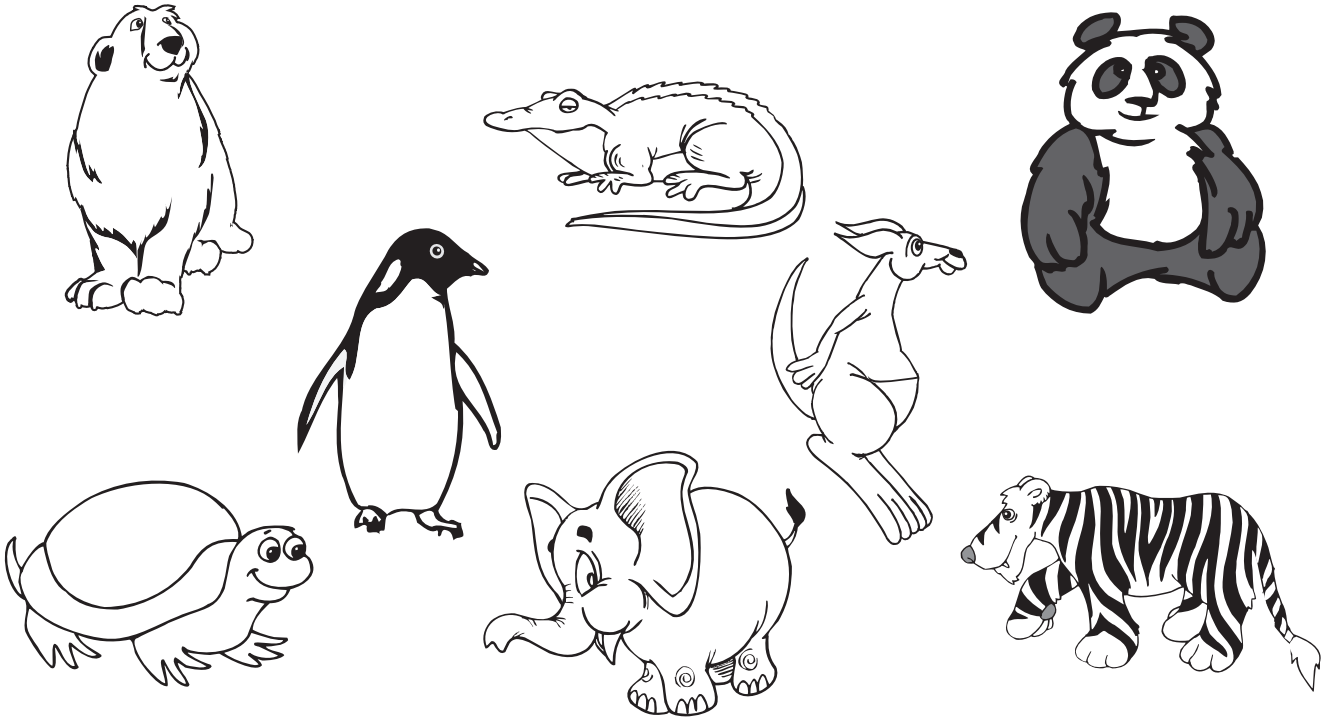
Web sites

http://media.emgames.com/emgames/demosite/demolevel1.html

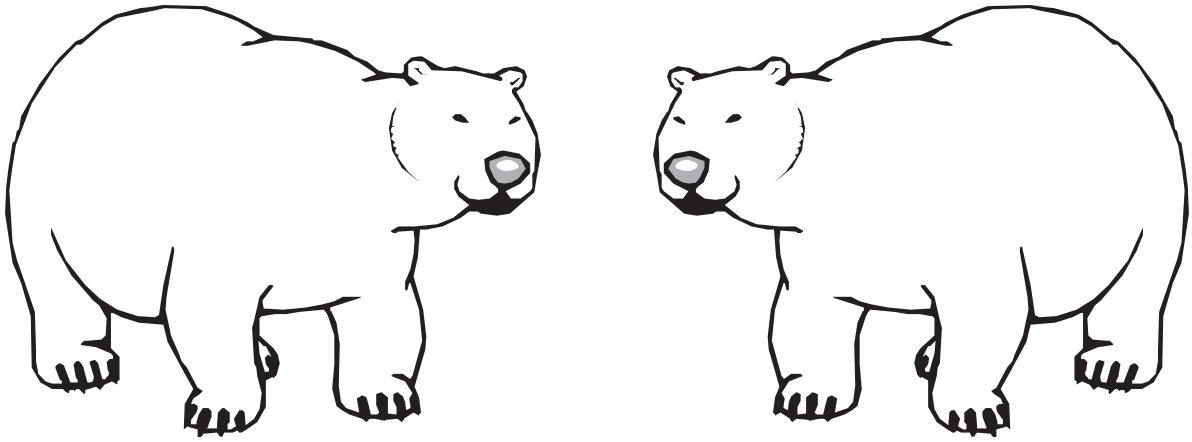
Hiding Animals



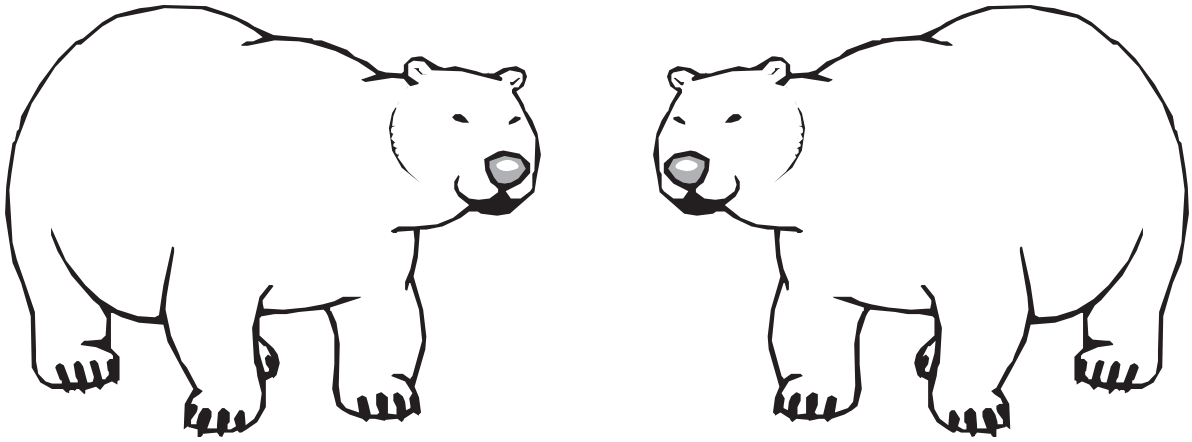
Hiding Animals



Bear Squeeze



Bear Squeeze



Hundreds Board

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Bear Squeeze Checklist

	YES	NO
Appropriate vocabulary terms such as more, less, greater than, less than, equal to have been used.		
Secret number was recorded in journal.		
Tally marks were used to track how many questions their partner asked to find their secret number.		
Student remarks demonstrate understanding of concept.		

Name _____

Mystery Number—Clue Sheet

Instructions: Please come up with five clues that fellow classmates can use to find your mystery number.

1st Clue:

My mystery number is more than _____.

2nd Clue:

My mystery number is less than _____.

3rd Clue:

My mystery number is more than _____.

4th Clue:

My mystery number is less than _____.

5th clue:

The sum of my digits add to _____.

My Mystery Number is: _____

Tic-Tac-Toe

Math Standard I

Objective 2

Standard I:

Students will acquire number sense and perform simple operations with whole numbers.

Objective 2:

Identify simple relationships among whole numbers up to 100.

Intended Learning Outcomes:

5. Understand and use basic concepts and skills.

Content Connections:

Content II-2; Discuss/practice aspects of community

Connections

Background Information

The following activities have been designed to be utilized as center activities. The activities could be used as whole group or small group activities, but the number of materials will need to be adjusted. These center activities have also been designed to meet the needs of the diverse learning populations found in today's classroom. By differentiating the process of how the content is learned and considering the various learning profiles of students using these center activities, student knowledge and understanding will be increased. Before beginning activities, you may want to pre-teach some of the activities and exposure to vocabulary like greater than, less than, and equal to, as well as an understanding that greater than and more than are equivalent terms.

Research Basis

Rillero, P. & Allison, J. (1997). Creative childhood experiences in mathematics and science: projects, activity series and centers for early childhood. ERIC Source (ED 411 145). Retrieved December 27, 2007, from http://www.eric.ed.gov

This article discusses the use of activity centers in early childhood classrooms. It defines activity centers as areas for children to investigate in a self-directed manner, with greater autonomy, which promotes learning. It also encourages the use of mathematical manipulatives as a foundation for more abstract thinking in the activity centers.

Ediger, M. (1999). Organizing for instruction in mathematics. Journal of Instructional Psychology. 26(2)85-91.

Setting up a mathematics classroom that incorporates whole group instruction, concrete to abstract activities, learning centers, and differentiation can be a tremendous challenge. This article provides ideas of how to help do this successfully; as well as, how to increase student achievement through this type of organization.

Invitation to Learn

Materials

- ❑ *Tic-Tac-Toe*

Ask the students if they have ever played "Tic-Tac-Toe"? Show students the *Tic-Tac-Toe* sheet and talk about how you get a "Tic-Tac-Toe". Explain that today they are going be completing a "Tic-Tac-Toe" as they do their math centers and use the *Tic-Tac-Toe* sheet to help show which center is which.

Instructional Procedures

In the Can

Materials

- ❑ Film canisters
- ❑ Small objects
- ❑ *In the Can*

1. To play In the Can, the student selects two film canisters. Inside the film canisters, there will be small sets of items with five items or more inside. Buttons, counters, pennies, and beans are just a few examples of what could be inside.
2. The student opens one canister at a time and counts the number of objects inside.
3. On the *In the Can* sheet, the student draws the number of objects inside the first canister and puts the objects back in.
4. The student then opens the second canister and counts the number of objects inside and records it on the handout.
5. Then in the boxes below the cans, the student labels which canister had the greater/lesser amount.
6. Repeat one more time with two different canisters.

Cover that Number

Materials

- ❑ *Cover that Number*
- ❑ *Number Cards A, B, & C*

1. Each pair of students needs two *Cover that Number* game boards and a set of *Number Cards.*
2. The students take turns pulling a *Number Card.* They then read the number and place it on the game board accordingly. If they are unable to place the card, the card gets returned back to the bottom of the pile and they lose their turn.
3. The first student to cover the board first is the winner.

War

Materials

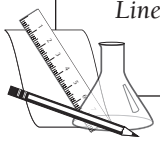
- ❑ *Ten Frame Cards*

1. To play War, each pair of students needs a set of *Ten Frame Cards.*
2. They then divide the cards evenly between both players.

3. At the same time, they say "1, 2, 3, flip" and flip over their top card. The player with the card that has more dots, wins the cards.
4. Students keep playing until all the cards are gone.
5. When finished, they count their cards and the player with the most cards wins.
6. Students can play again, but this time the card with less would win.

Materials

- ❑ *Step-by-Step Number Line*
- ❑ *Find It on the Number Line*



Find It on the Number Line

1. To play Find It on the Number Line students need to work in pairs. Then as pairs, students decide who is going to be the reader and who will be the doer. The doer will be using the *Step-by-Step Number Line* to find the answer.
2. The reader grabs a set of *Find It on the Number Line* activity cards.
3. The reader reads one activity card at a time to the doer.
4. The doer steps on a number on the *Step-by-Step Number Line* that answers the activity card.
5. Once the reader has gone through the activity cards once, then the doer and the reader switch roles.

Materials

- ❑ Math journal
- ❑ Pencil
- ❑ Teddy bear counters
- ❑ Number line 1-100

Bear Squeeze

1. Working in partners, Student A writes down a mystery number in their math journal.
2. Student B makes a guess at what number their partner has written in their math journal.
3. Student A moves the teddy bear counter on the number line to show if the number is more or less than what Student B said. (e.g. If a student A's mystery number is 35 and student B guesses, "is it more 23," then student A would move the bear to 23 and say, "no, it is greater than 23.")
4. Student B keeps asking questions until they have found the mystery number and Student A keeps track of how many questions were asked by their partner by using tally marks in their journal.
5. Once Student B has found the mystery number, they switch roles and play again.

More or Less

Materials

- ❏ Dominoes
- ❏ *More/Less Spinner*
- ❏ Pencil
- ❏ Paperclip

1. To play More or Less, students need to be in pairs.
2. As a pair, they lay out 16 dominoes in a 4 x 4 arrangement.
3. Before each turn, one player must spin the spinner to decide if the domino that is more/less will be the winner.
4. Then each player takes a domino.
5. Whichever player has the domino that is more/less depending on what the spinner selected, wins the pair of dominoes.
6. Repeat until all dominoes are gone.
7. The player with the most dominoes wins or the more/less spinner could be used to decide the winner.

Make Sets

Materials

- ❏ *Make Sets More/Less/Same Cards*
- ❏ *Make Sets Activity Cards*
- ❏ Counters/beads/Cheerios

1. Student chooses one of the eight *Make Sets Activity Cards*.
2. Then he/she makes a set of objects to show a set that has more, less, or the same as the set of objects on the activity card chosen.
3. The student then use the *Make Sets More/Less/Same* labels to designate which set is which.
4. Repeat with 3 more of the activity cards.

Race to the Top

Materials

- ❏ *Race to the Top*
- ❏ *Number Cards A, B, & C*
- ❏ Baggie
- ❏ Place markers

1. Working in pairs, each player takes a game board, place marker, and baggie of *Number Cards*.
2. Each player takes a *Number Card*.
3. Then the two players compare their numbers and whoever has the larger number gets to move up one space on the *Race to the Top* game board.
4. Place *Number Cards* in a discard pile and grab two new cards.
5. Continue playing until one player makes it to the flag at the top of the mountain.

Line Up Five

Materials

- ❏ *Line Up Five*
- ❏ *Number Cards A*

1. In partners, each pair needs two *Line Up Five* game boards and a set of *Number Cards A*.
2. The first player takes a *Number Card* and places it on their game board sequentially according to the number they pulled.

3. Then it is the second player's turn to do the same thing on their game board.
4. The numbers need to be in order and cannot be moved once placed.
5. As the game continues, if they are unable to place the card then they return the card to the pile and lose their turn.
6. The game ends when one player fills one line of five across.

Assessment Suggestions

- Collect the *In the Can* handout to check for understanding of vocabulary such as greater than, less than, and equal to.
- Monitor the *Make Sets* to see if students are able to make sets that are more, less, and the same as the *Activity Cards.*
- Have students write their own activity card for the *Step-by-Step Number Line* activity.

Curriculum Extensions/Adaptations/ Integration

- For the game *In the Can*, you could have them write the number word for the canister they choose rather than the can number.
- To differentiate for higher ability students, number cards from 1-200 could be used in the activities Race to the Top and Line Up Five.
- To make *Line Up Five* more difficult, you could use *Number Cards B & C* and use the blank grid to do numbers from 37-72 and 73-100.
- There is a list of other activities that can be done with the ten frame cards that can be found on the Granite School District website, listed below.
- For struggling learners, these activities could be practiced in teacher-led small group lessons before being exposed to them at centers.

Family Connections

- Send home *Line Up Five* and *Number Cards A* with students to do with family members at home.
- Send home *Race to the Top* game boards and *Number Cards A, B, & C* and have them play with someone at home.

Additional Resources

Books

Number Lines: How Far to the Car?, by John Burstein; ISBN 0-8368-3815-7

100 Days of Cool, by Stuart J. Murphy; ISBN 978-0-06-000123-0

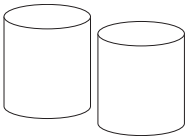
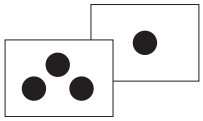
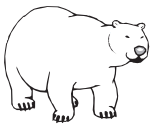
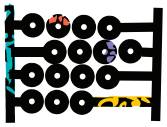
Web sites

http://www.rainforestmaths.com

http://www.graniteschools.org/C7/C19/MathK-12/Core%20Support%20Documents/TenFrames.pdf

Name _____

Tic-Tac-Toe

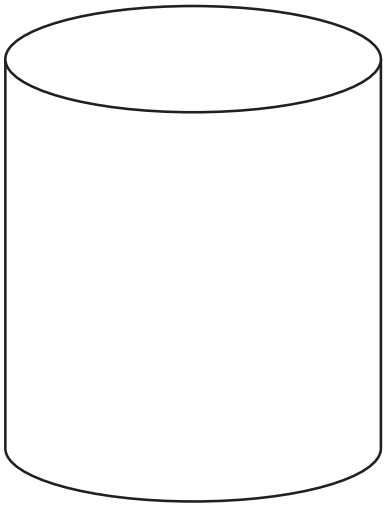
In the Can 	**Cover That Number** 	**War** 
Find It on the Number Line 	**Bear Squeeze** 	**More or Less** 
Make Sets 	**Race to the Top** 	**Line Up Five** 

Name _____

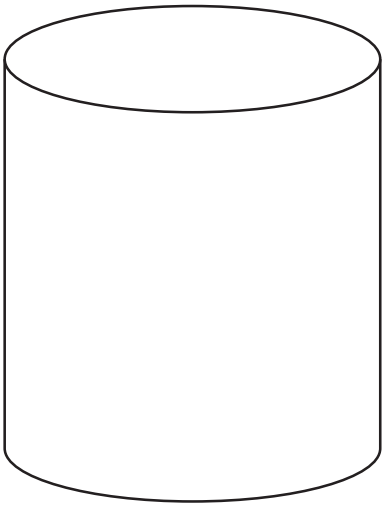
In the Can

Choose two containers. Draw the objects in each container and write the can number. Write greater than, less than, or equal two under each set of cans.

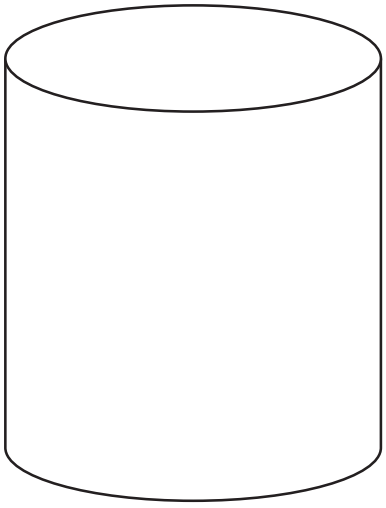
Can Number



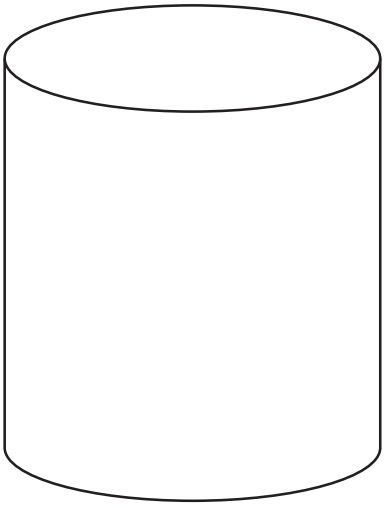
Can Number



Can Number



Can Number



Word Bank	Greater Than	Less Than	Equal To

Cover That Number

Less than 7	Less than 17
Less than 46	Less than 72
Greater than 12	Greater than 22
Greater than 49	Greater than 88

Cover That Number

Less than 7	Less than 17
Less than 46	Less than 72
Greater than 12	Greater than 22
Greater than 49	Greater than 88

Number Cards A

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

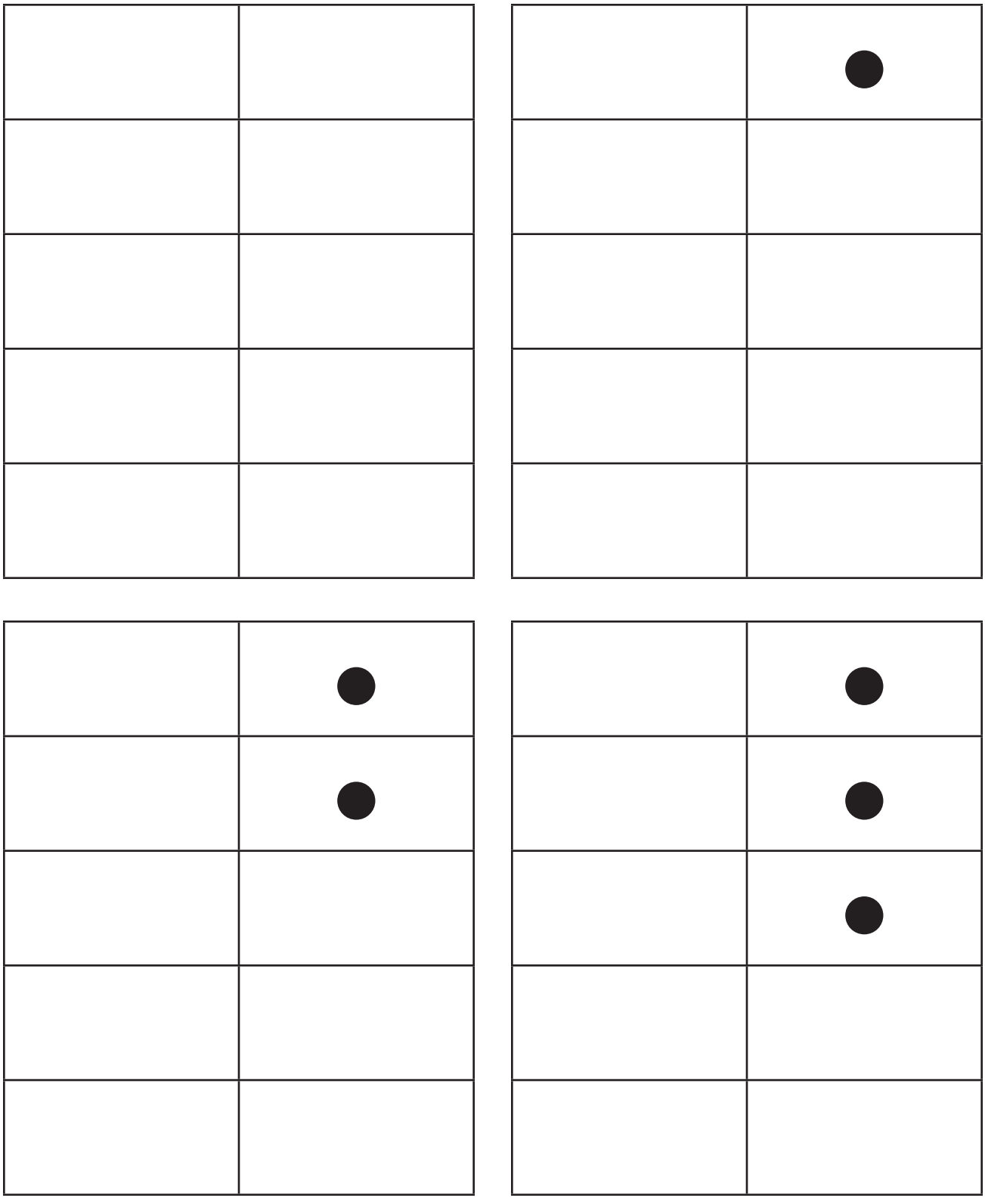
Number Cards B

37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72

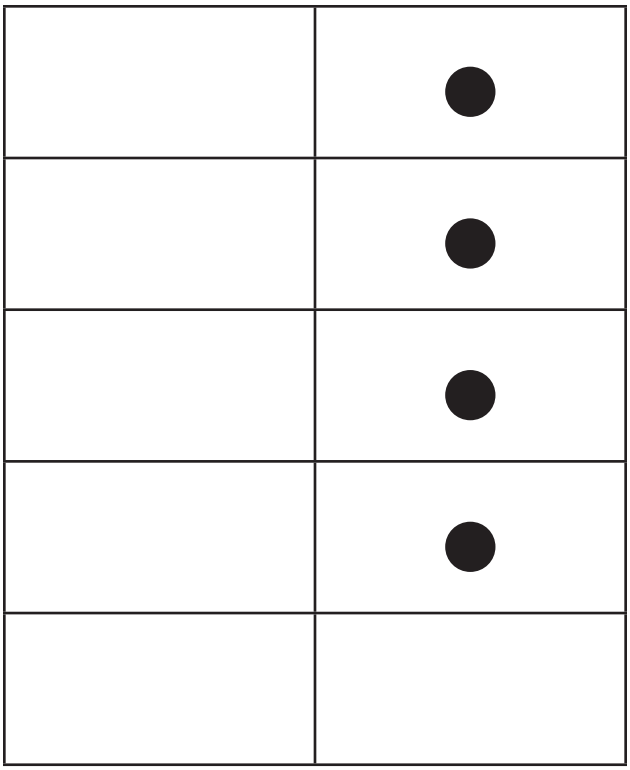
Number Cards C

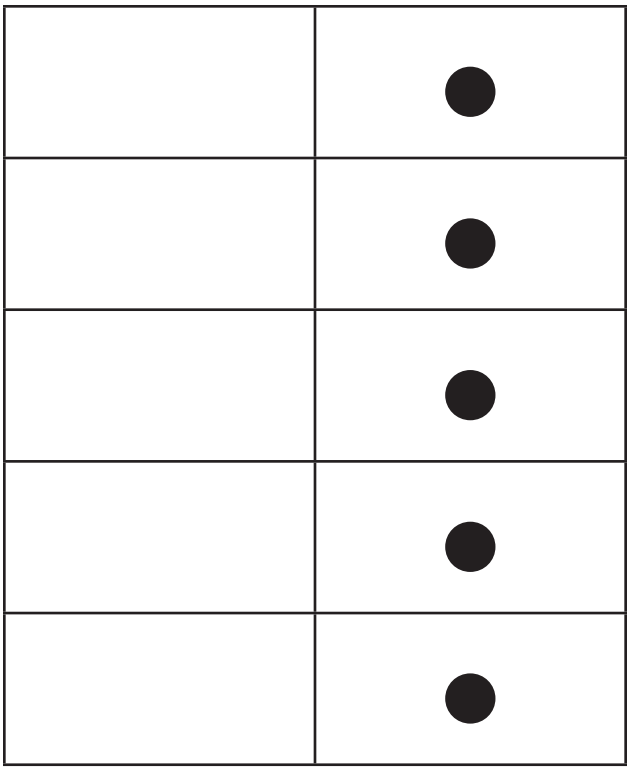
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100		

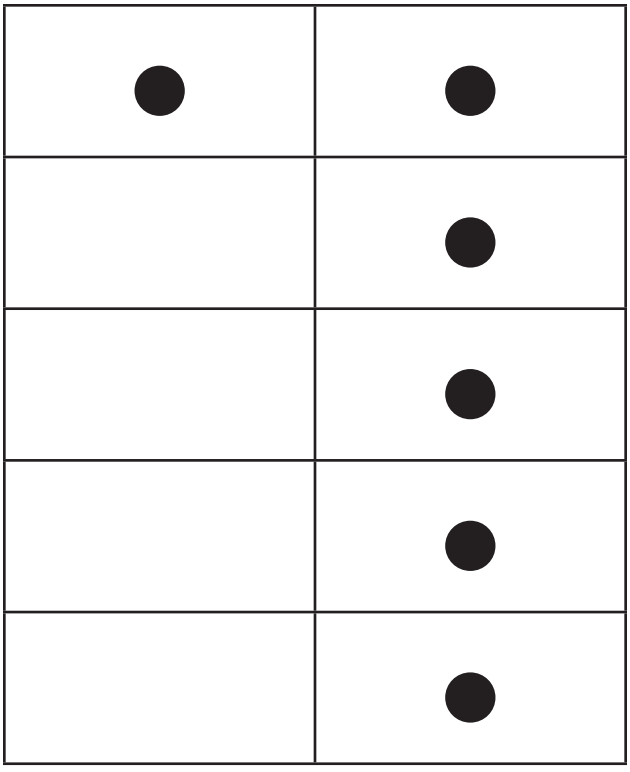
Ten Frame Cards

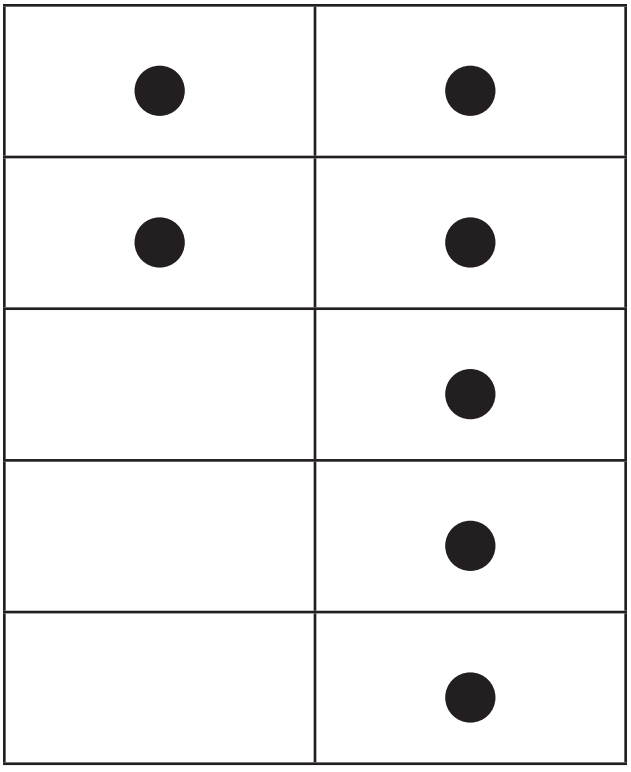


Ten Frame Cards

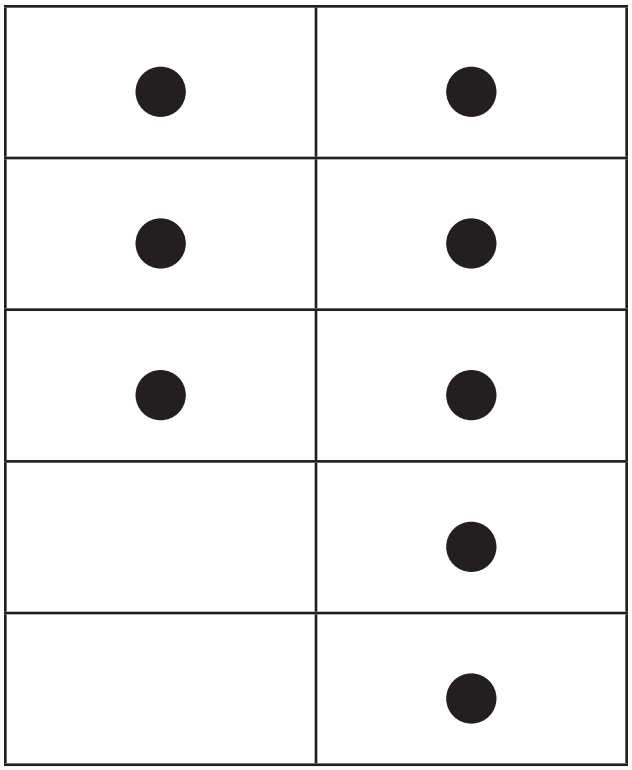


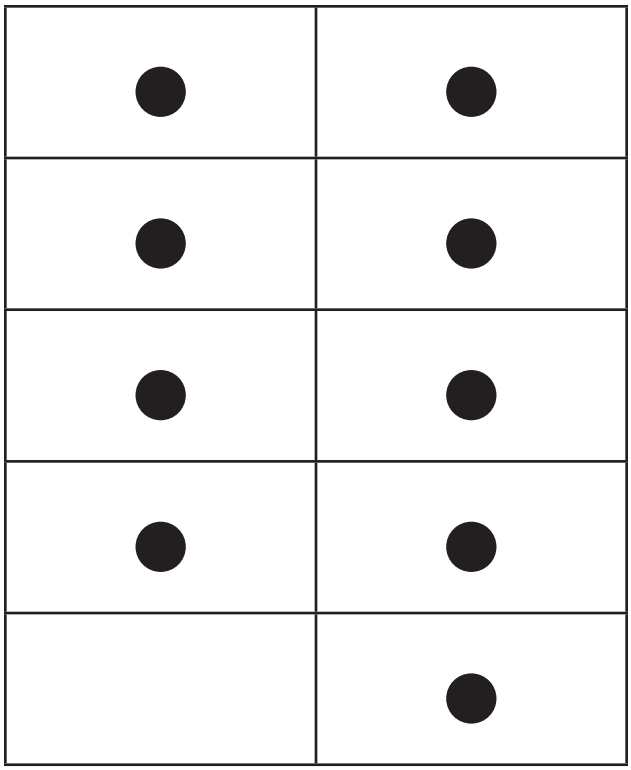


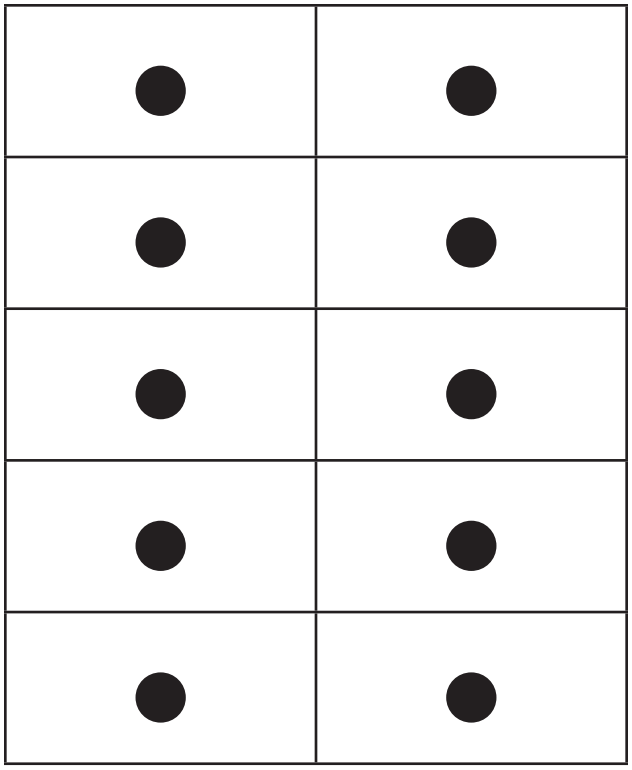




Ten Frame Cards







Find It on the Number Line

Greater than 6
Less than 11
Greater than 15

Find It on the Number Line

One more than 13
Same as 6 + 5
Equal to 7 + 3

Find It on the Number Line

One less than 7
One more than 8
One less than 19

Find It on the Number Line

10 more than 2
5 more than 3
10 more than 9

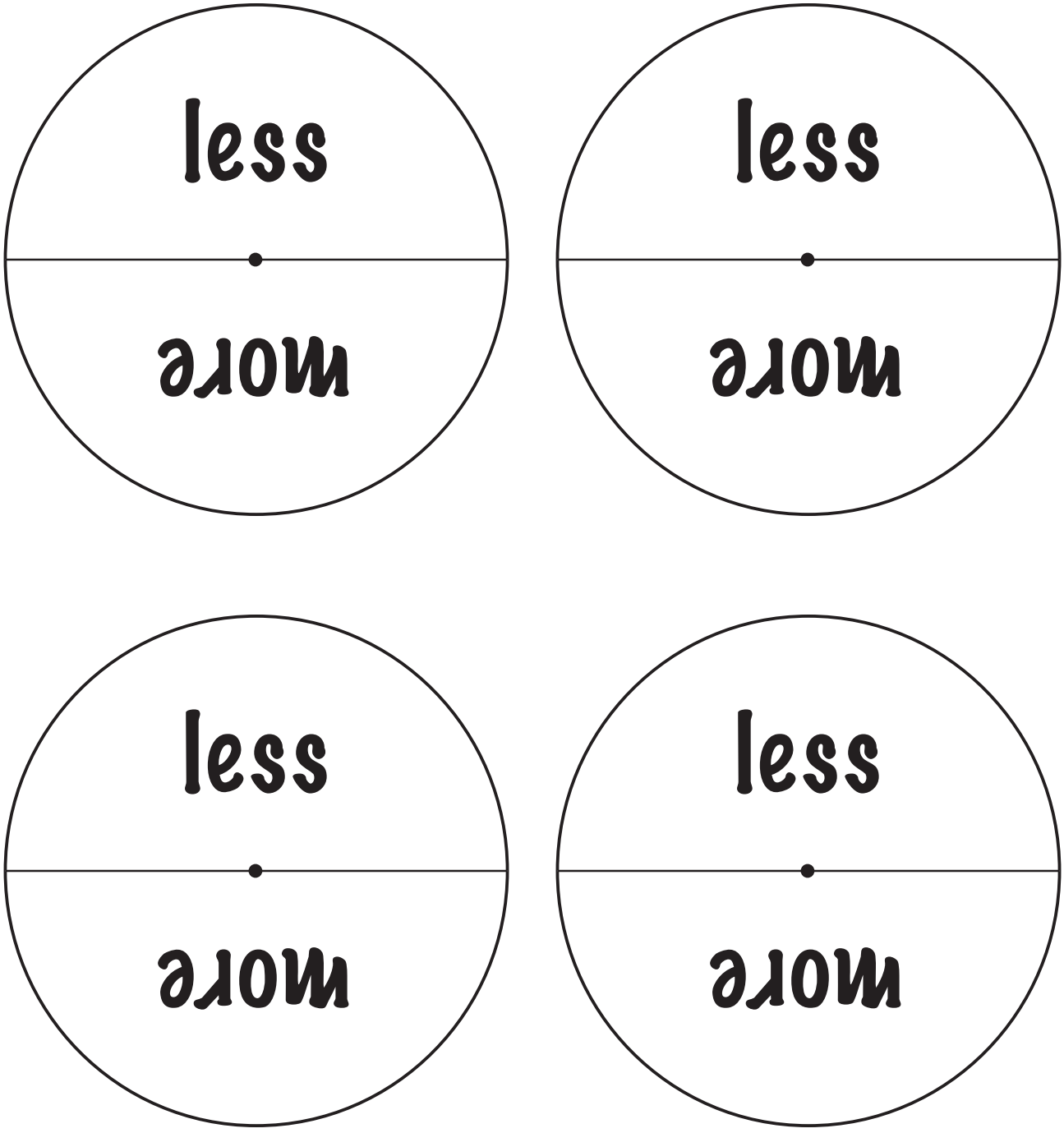
Find It on the Number Line

5 less than 12
10 less than 17
4 more than 7

Find It on the Number Line

Skip count by 2s
Skip count by 5s
Equal to 8 + 7

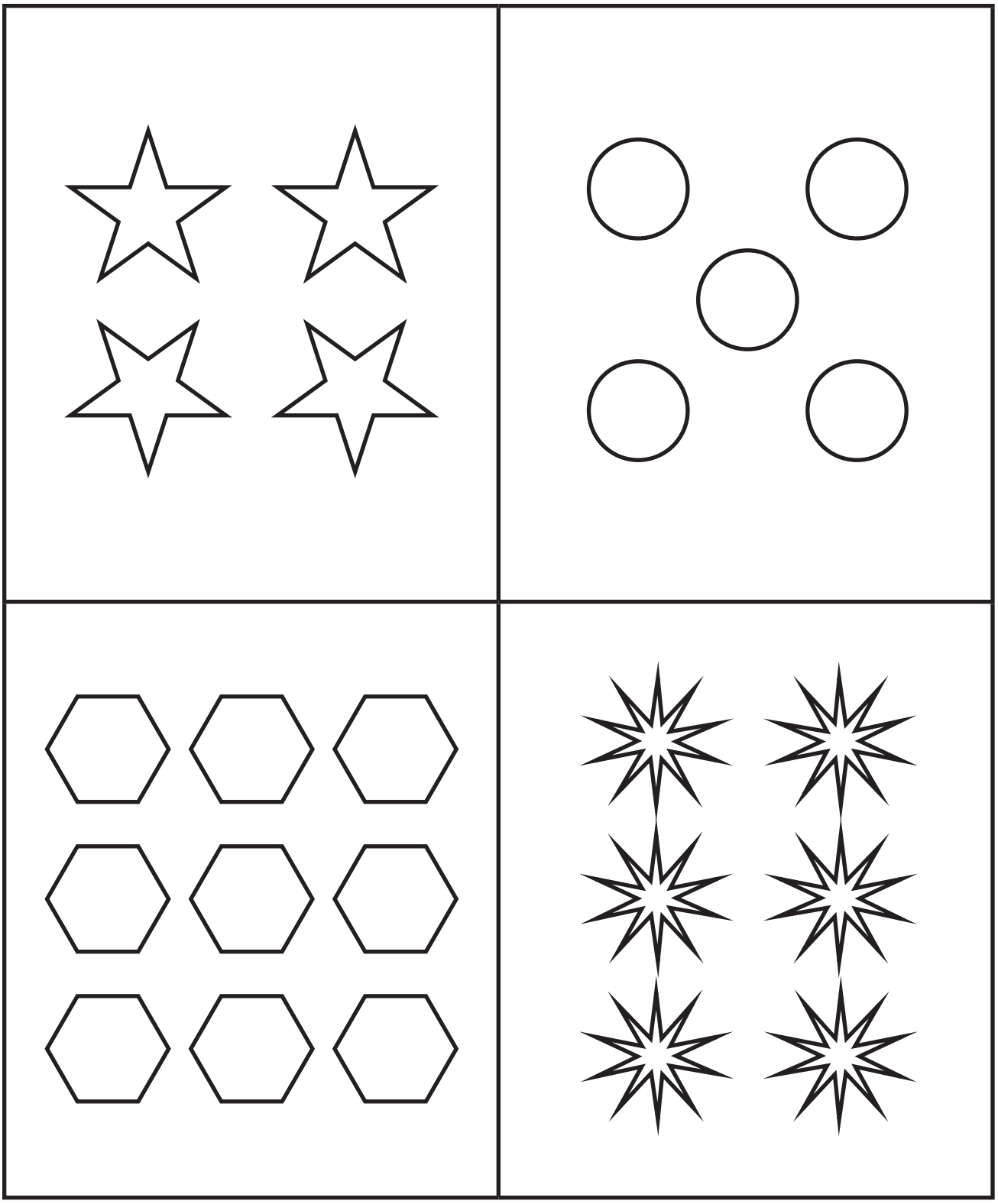
More or Less Spinner



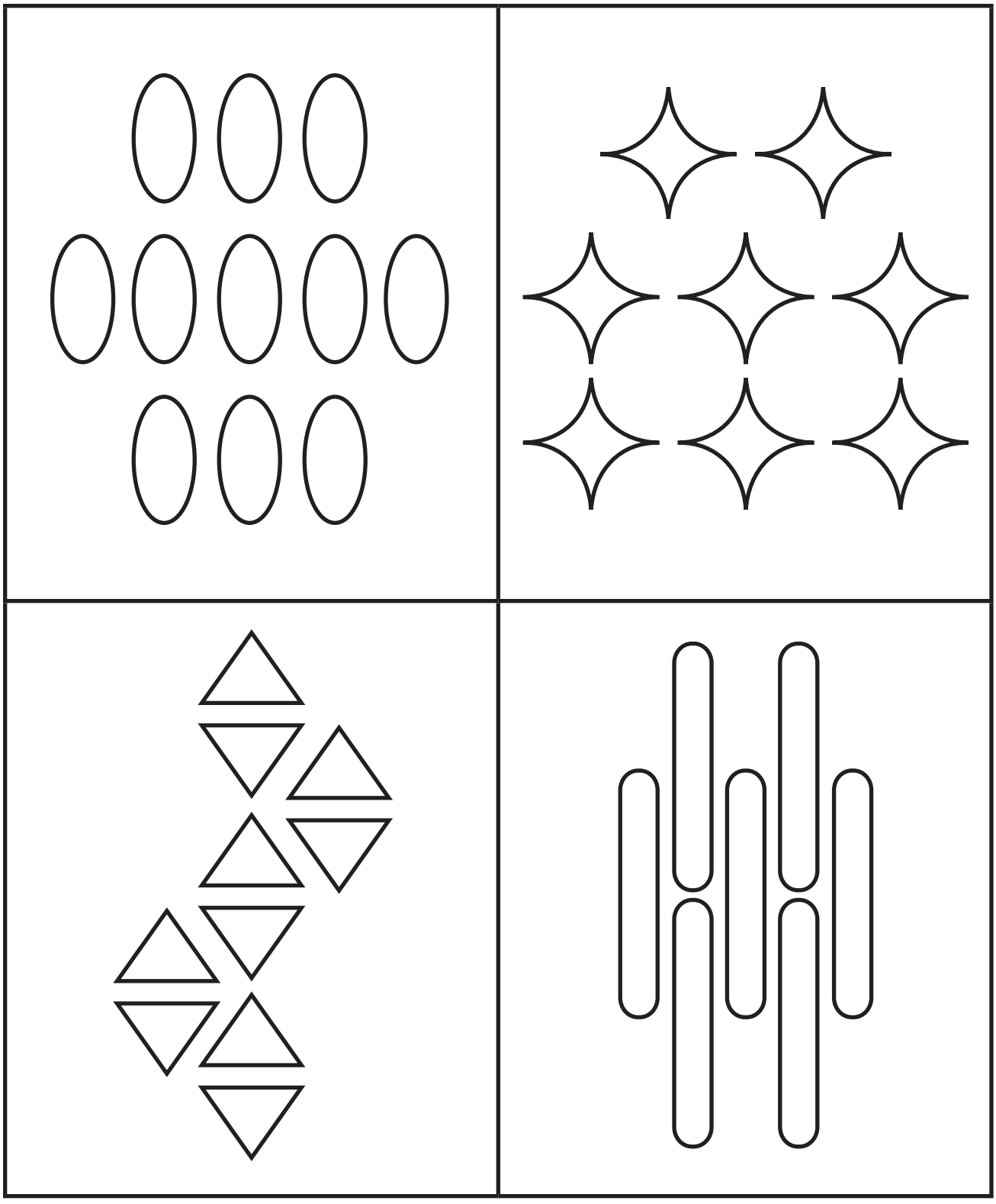
Make Sets More/Less/Same

more	less	same
more	less	same
more	less	same
more	less	same

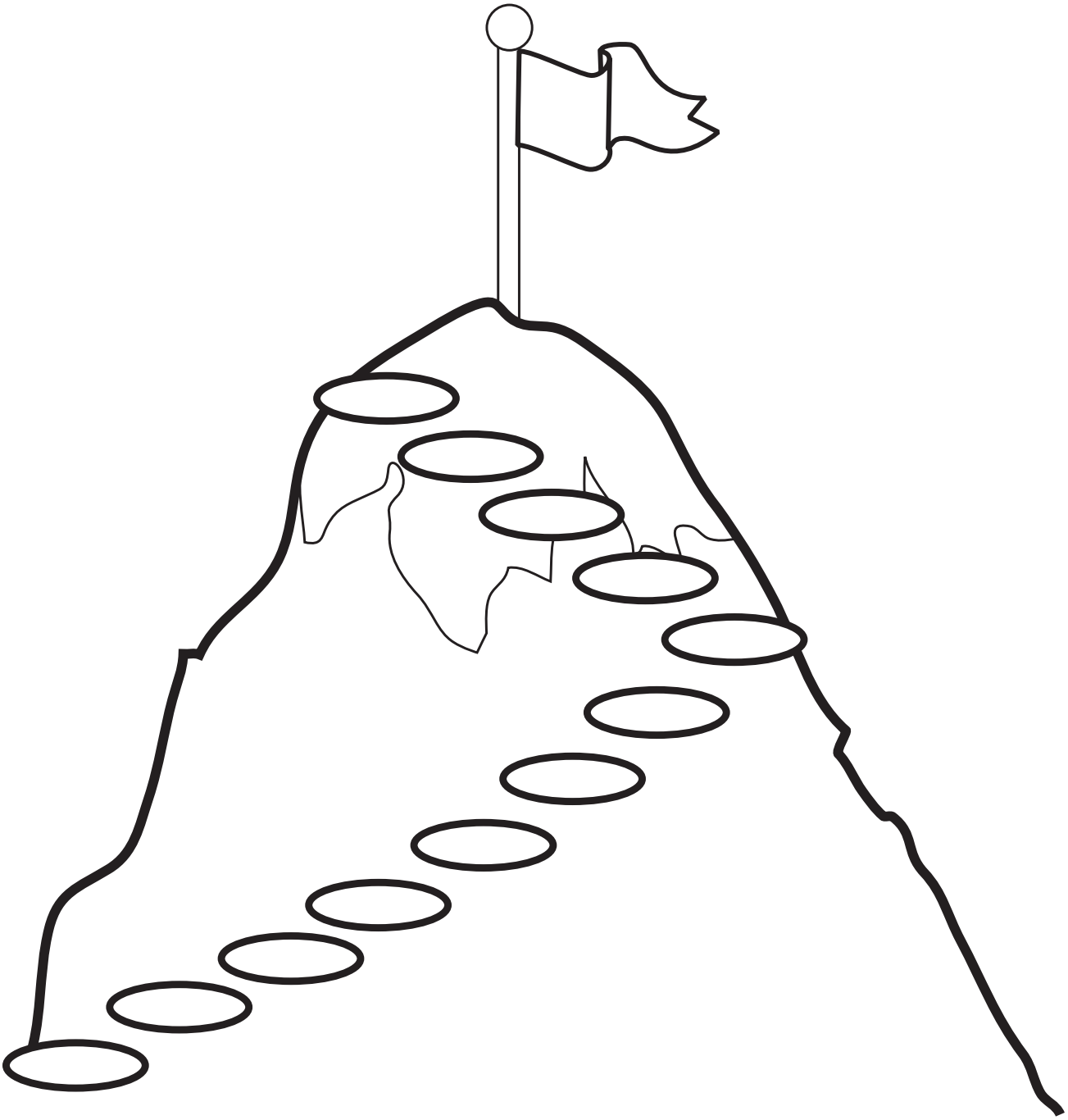
Make Sets Activity Cards



Make Sets Activity Cards



Race to the Top



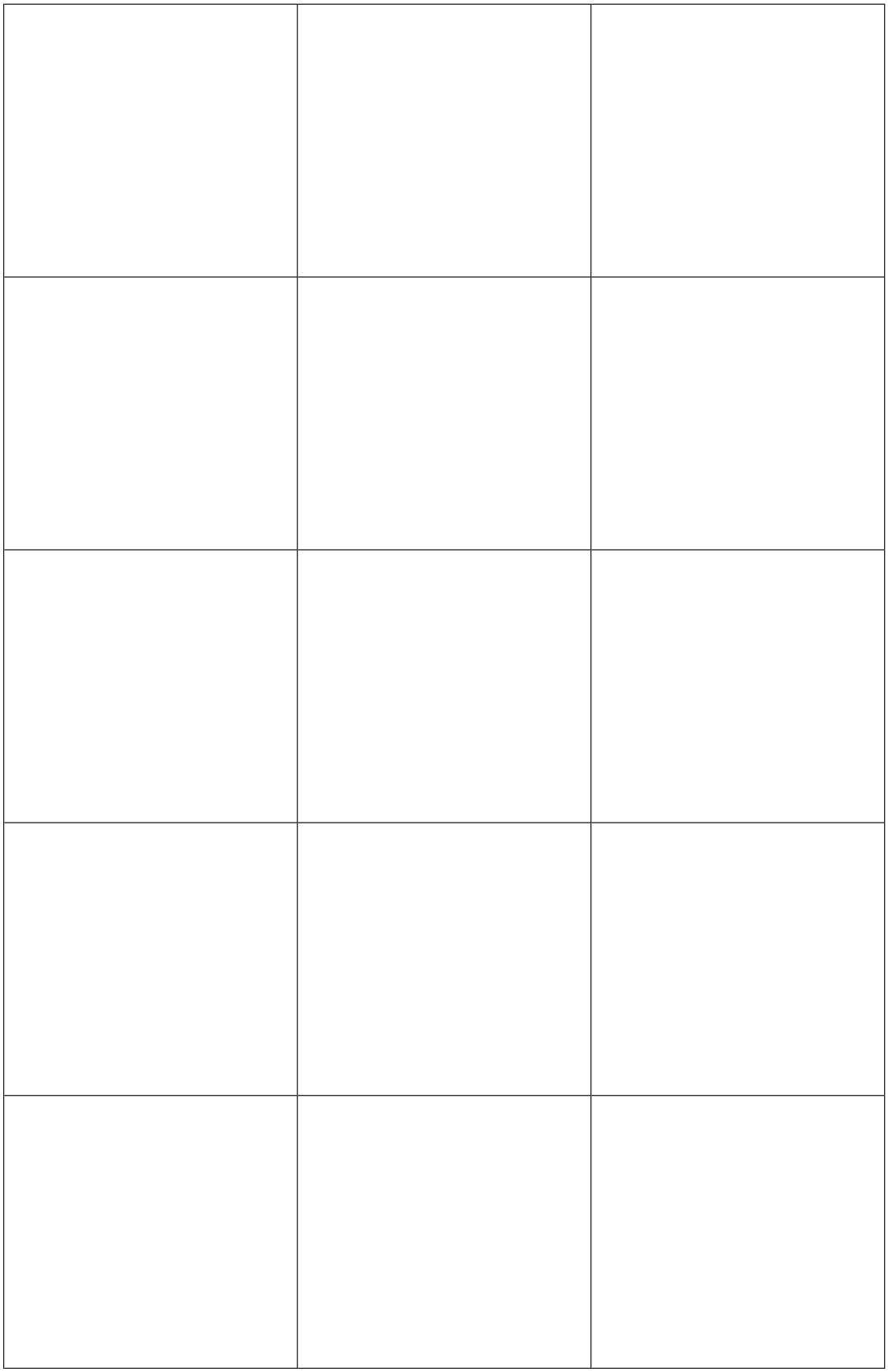
Line Up Five

8	18	28

Line Up Five

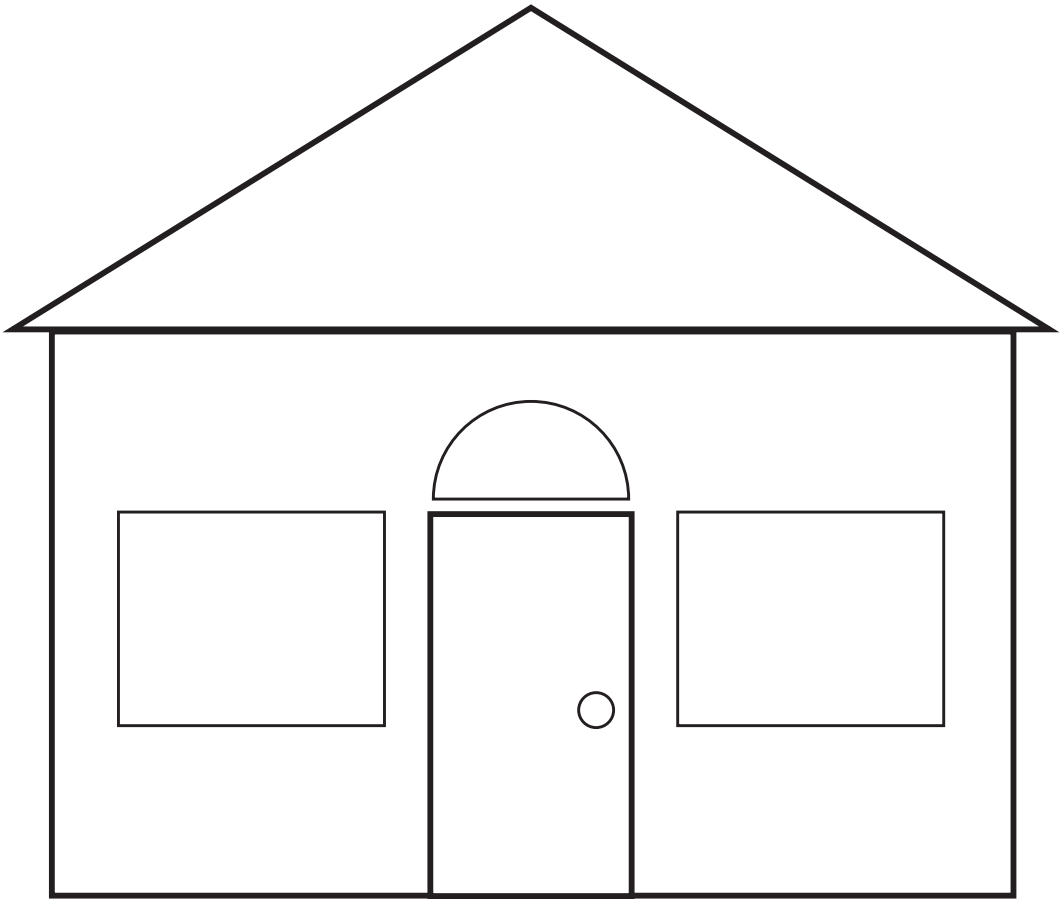
12	22	32

Line Up Five



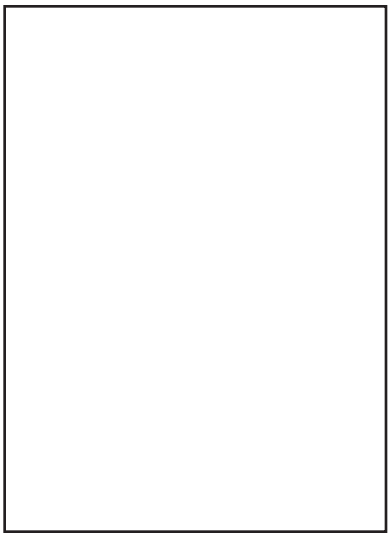
Appendix

Getting to Know You Glyph

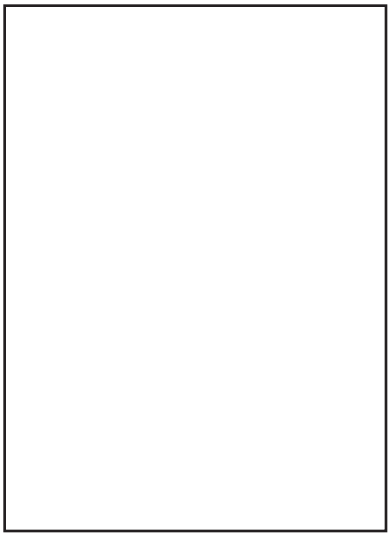


Blink

My teacher showed us this BLINK card



I could play this card on top of my teacher's card because...

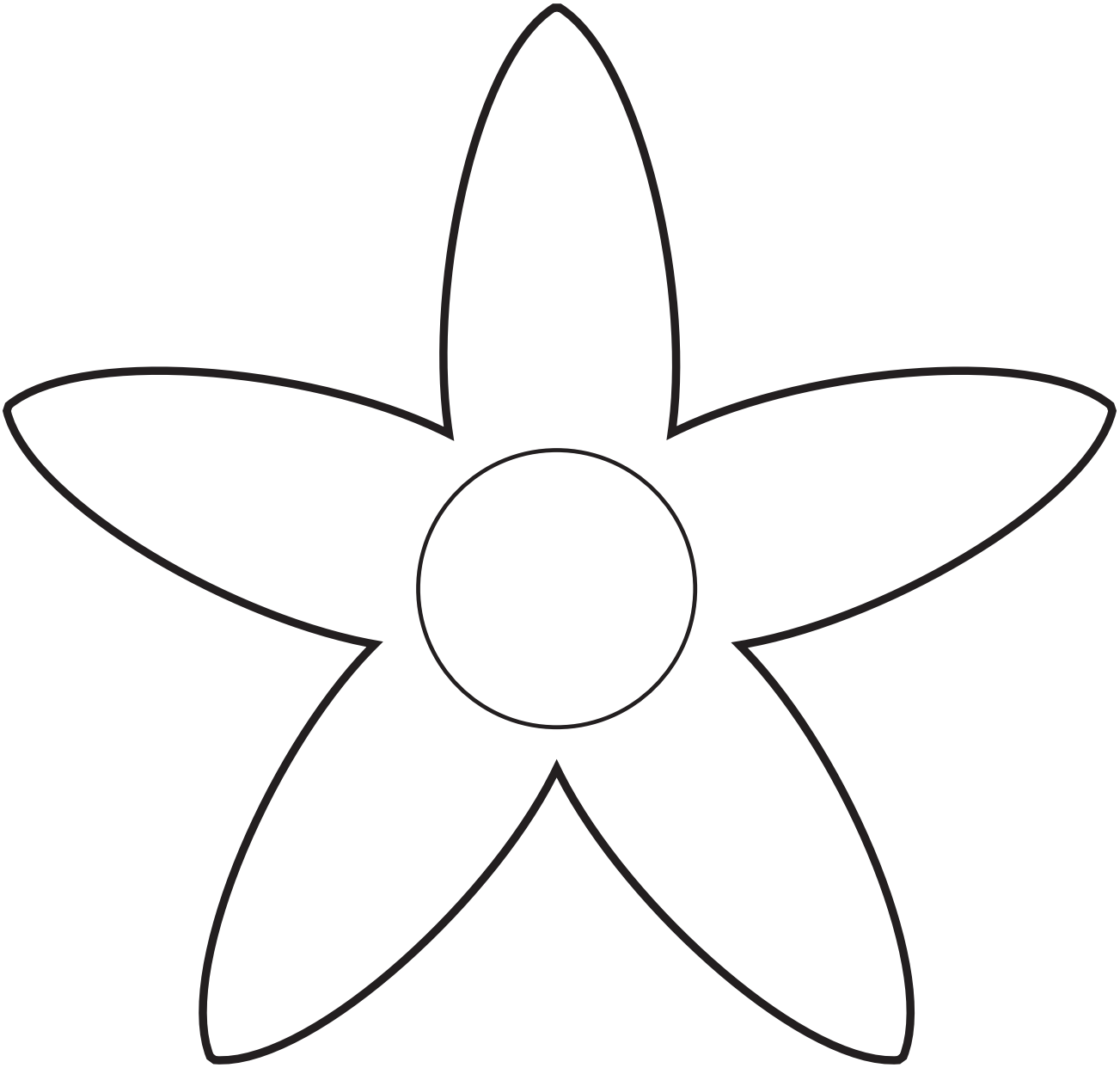


When I played BLINK I felt

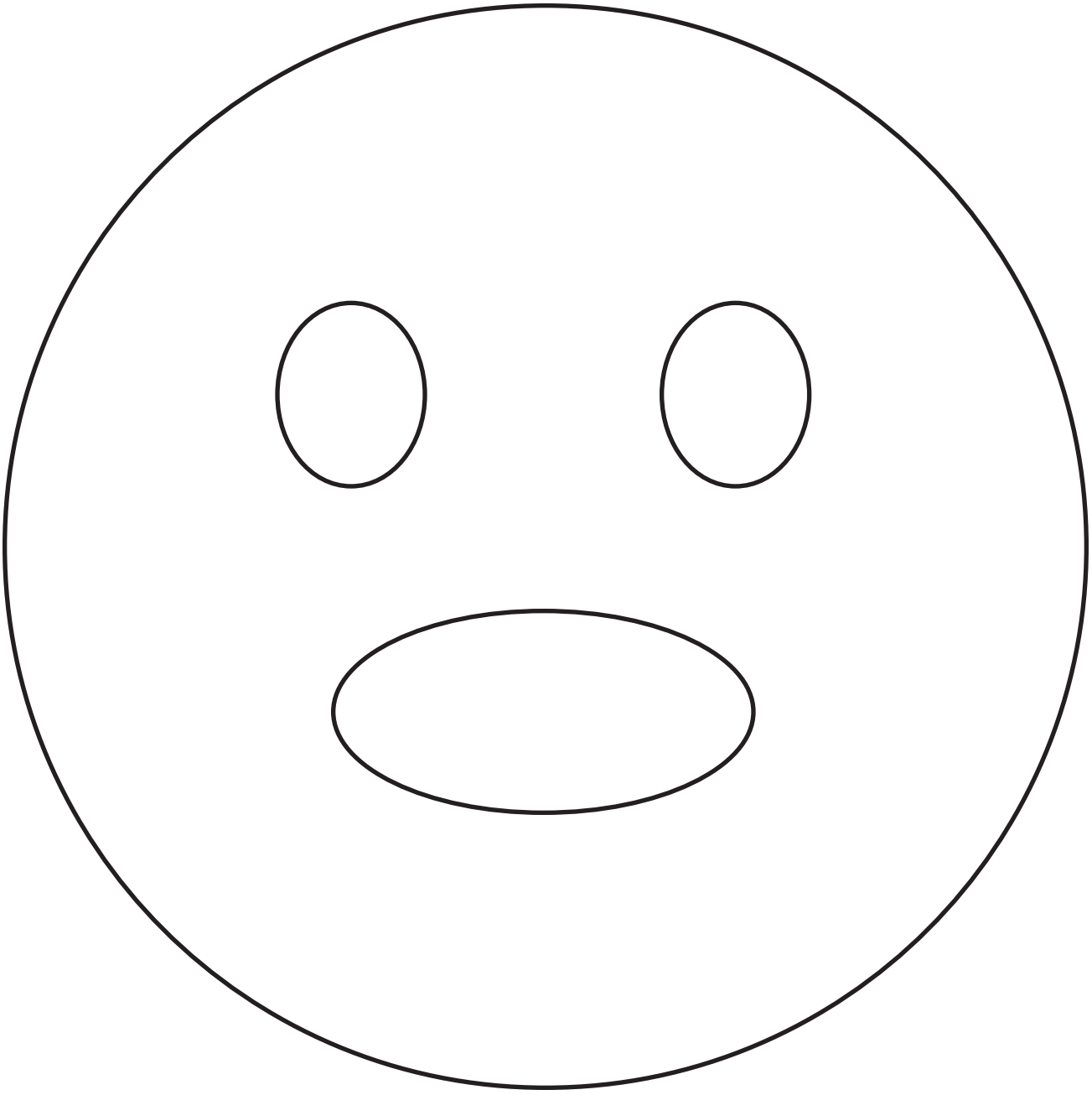
When I played BLINK I felt

Jasmine Journaling

In the center of the flower write the name of the following types of journals: Individual, Dialogue, Learning, or Team. In each of the petals write how, or why you could use that type of journal in your classroom. Locate the graphic organizer in the room and write one of the things you wrote on the petals.



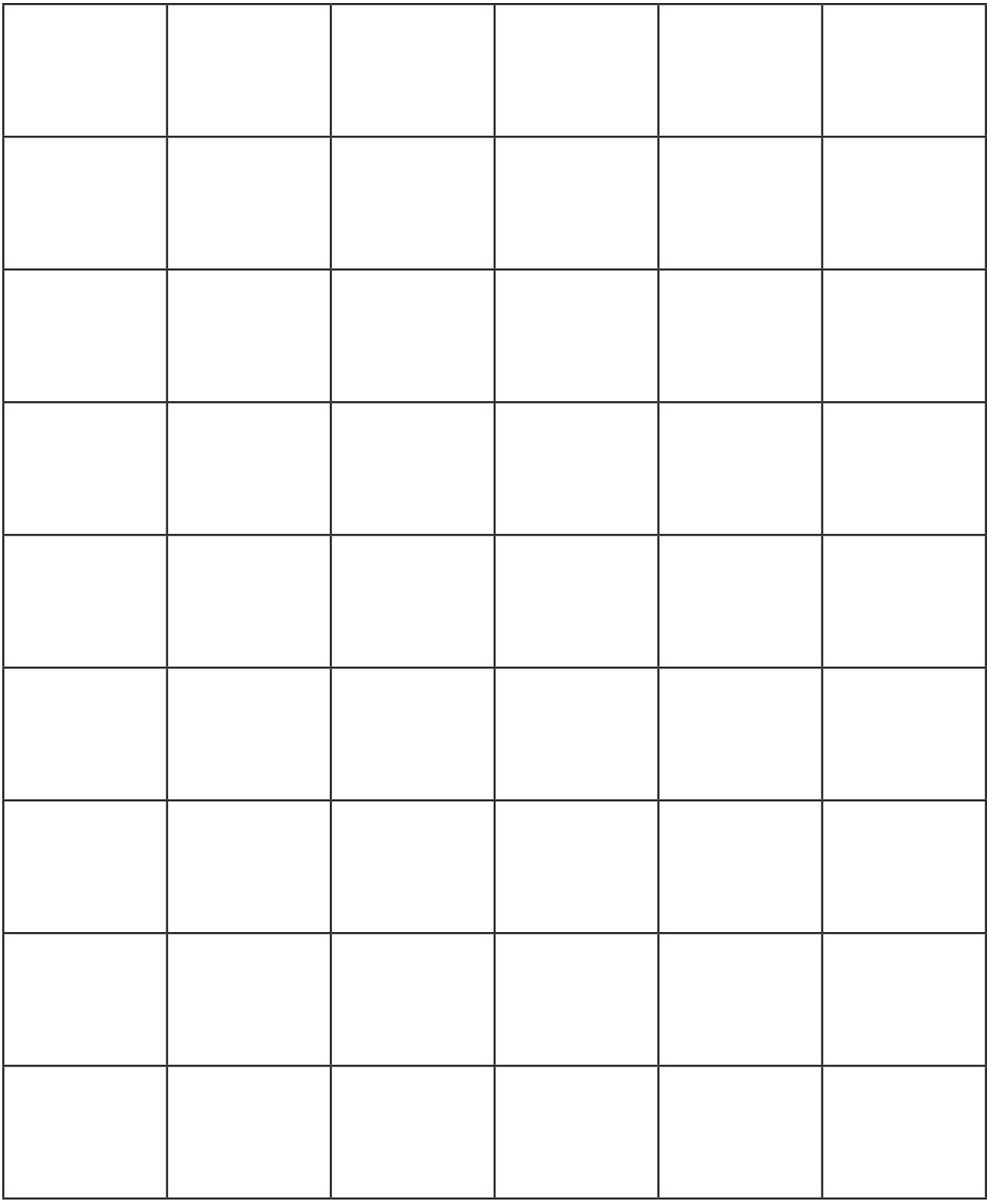
Mood Face



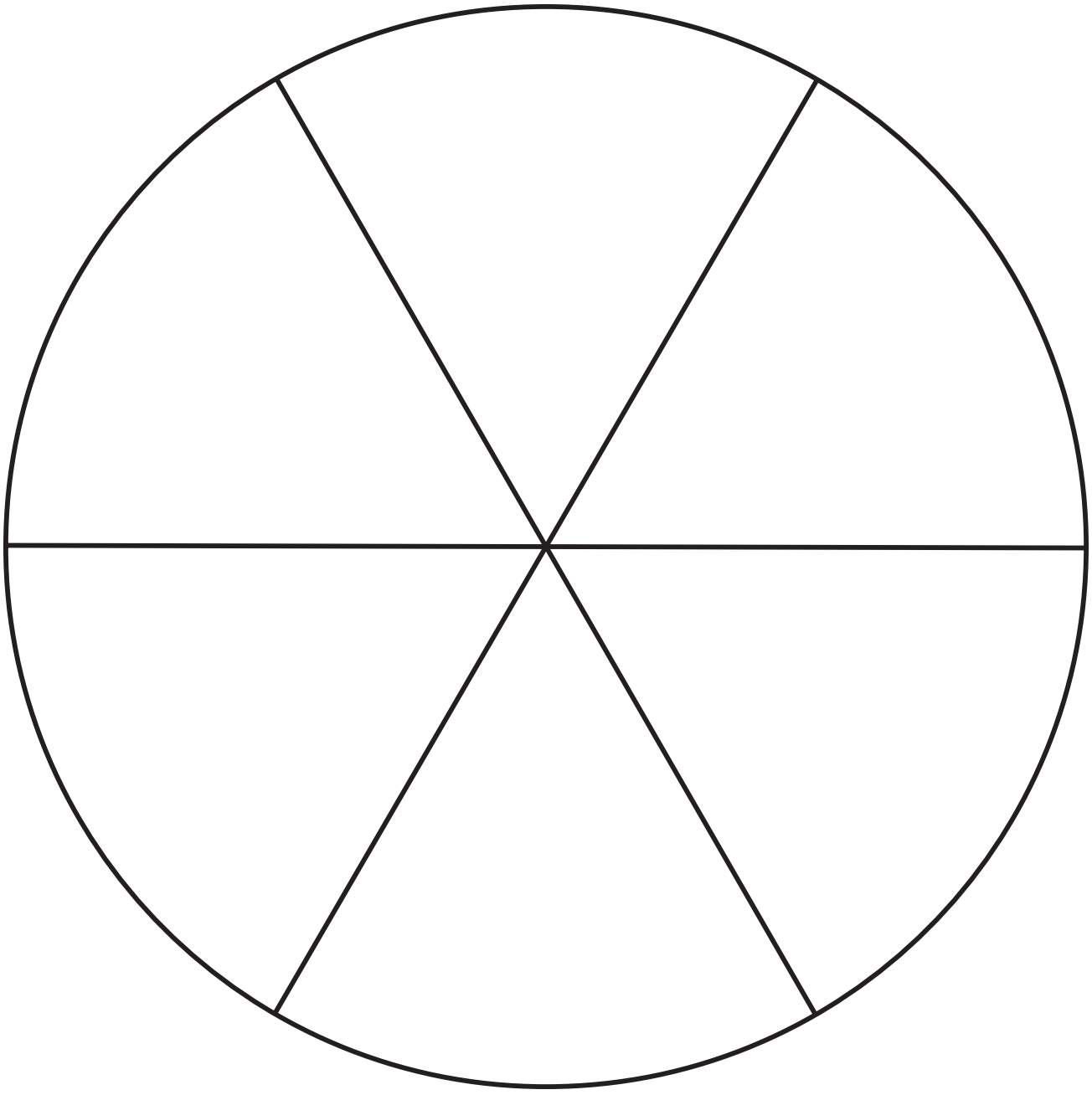
Mood BINGO

Happy	Sad	Jealous	Thankful
Shy	Mad	Glad	Excited
Angry	Lonely	FREE	Ecstatic
Frustrated	Embarrassed	Envious	Silly

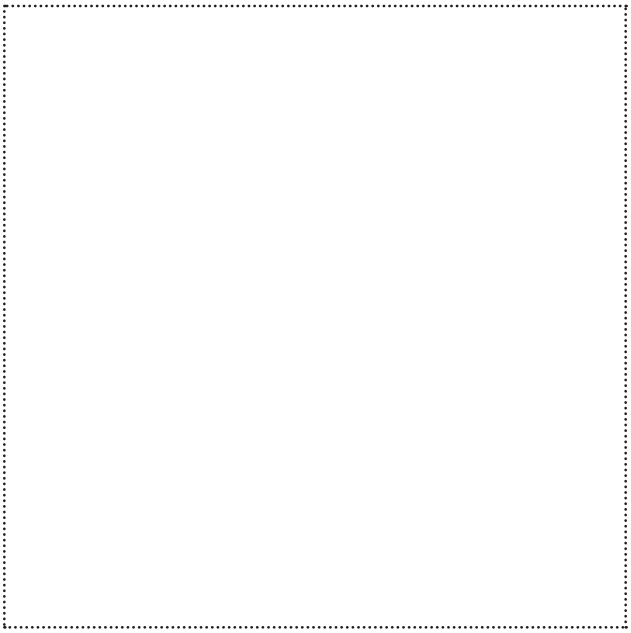
Mouse Graph

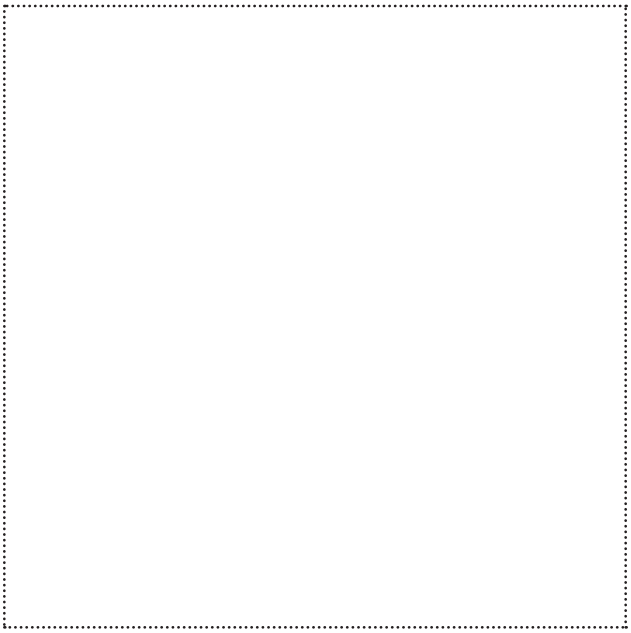


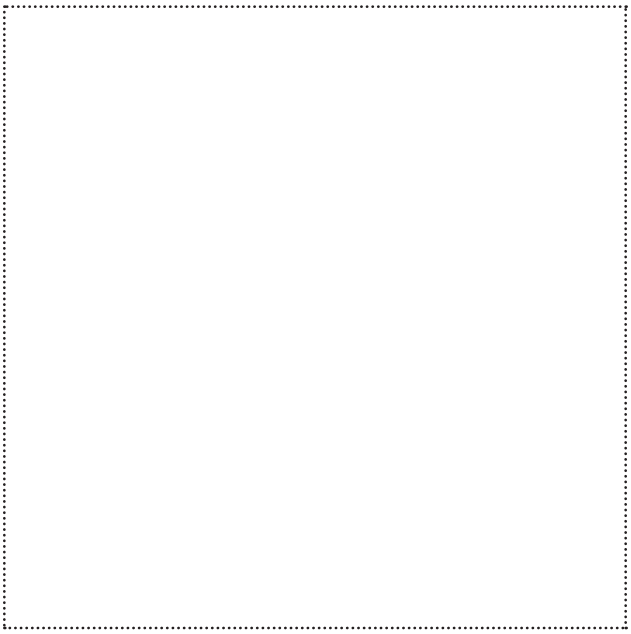
Color Wheel

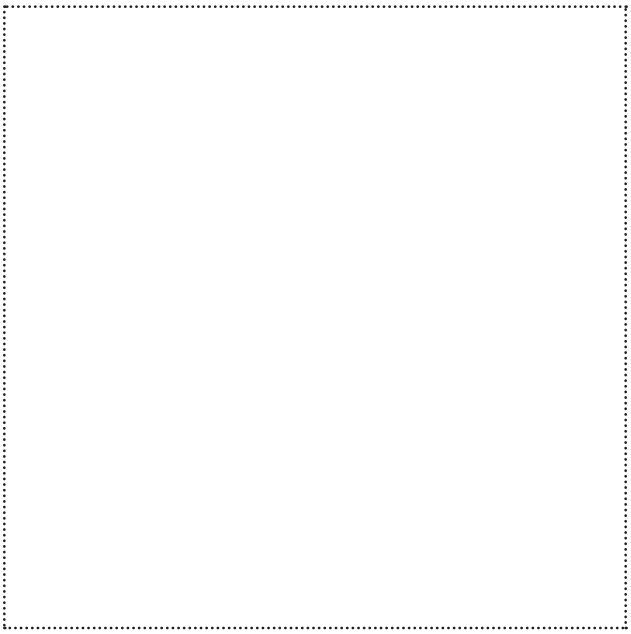


Four Square Art Page

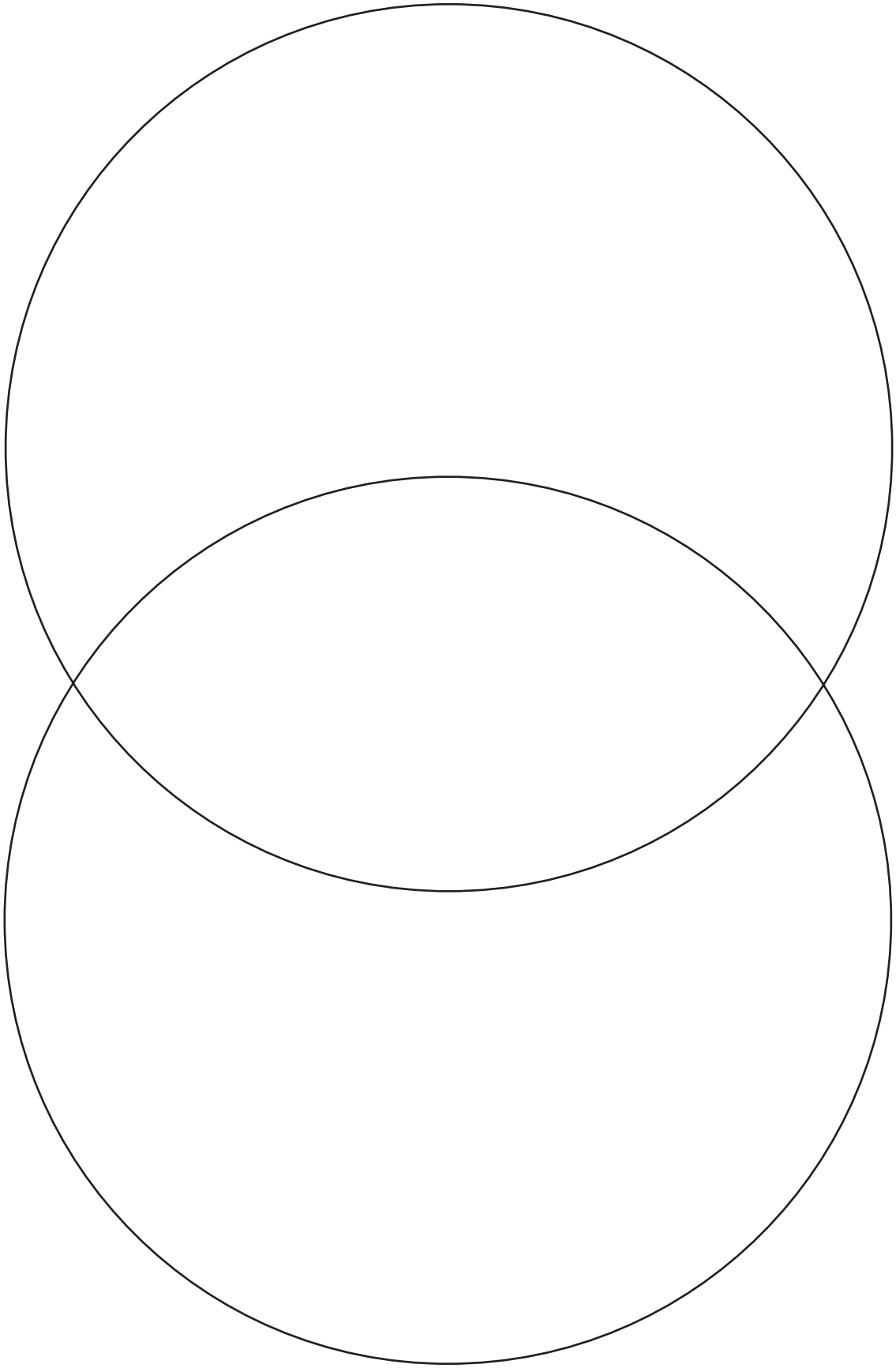








Venn Diagram



In Search of Cinderella (for boys)

☺ Reader 1: From dusk to dawn,

☞ Reader 2: From town to town,

☯ Reader 3: Without a single clue.

☺ Reader 1: I seek the tender, slender foot

☞ Reader 2: To fit this crystal shoe.

☺ Reader 1: From dusk to dawn,

☞ Reader 2: I try it on

☯ Reader 3: Each damsel that I meet.

☺ Reader 1: And I still love her so, but oh,

☺☞☯ All: I've started hating feet.

Waiting Cinderella (for girls)

Reader 1: My foot

Reader 2: It hurts!

Reader 3: I lost my crystal shoe!

Reader 1: I don't know where I left it.

Reader 2: Whatever shall I do?

Reader 3: My Prince will find

Reader 1: My fallen shoe

Reader 2: The one I left behind

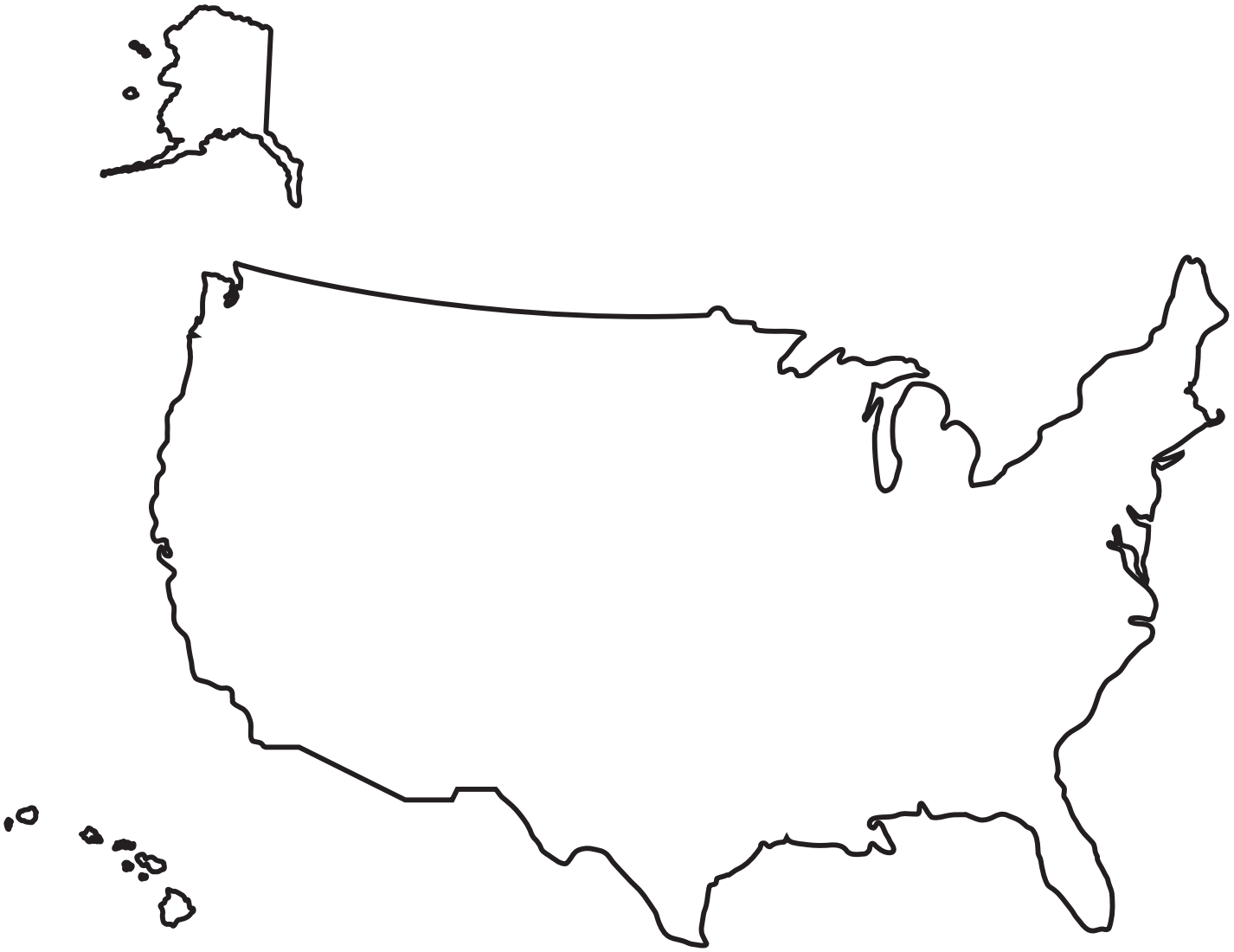
Reader 1: He's looking hard for me just now

Reader 2: I hope he isn't far.

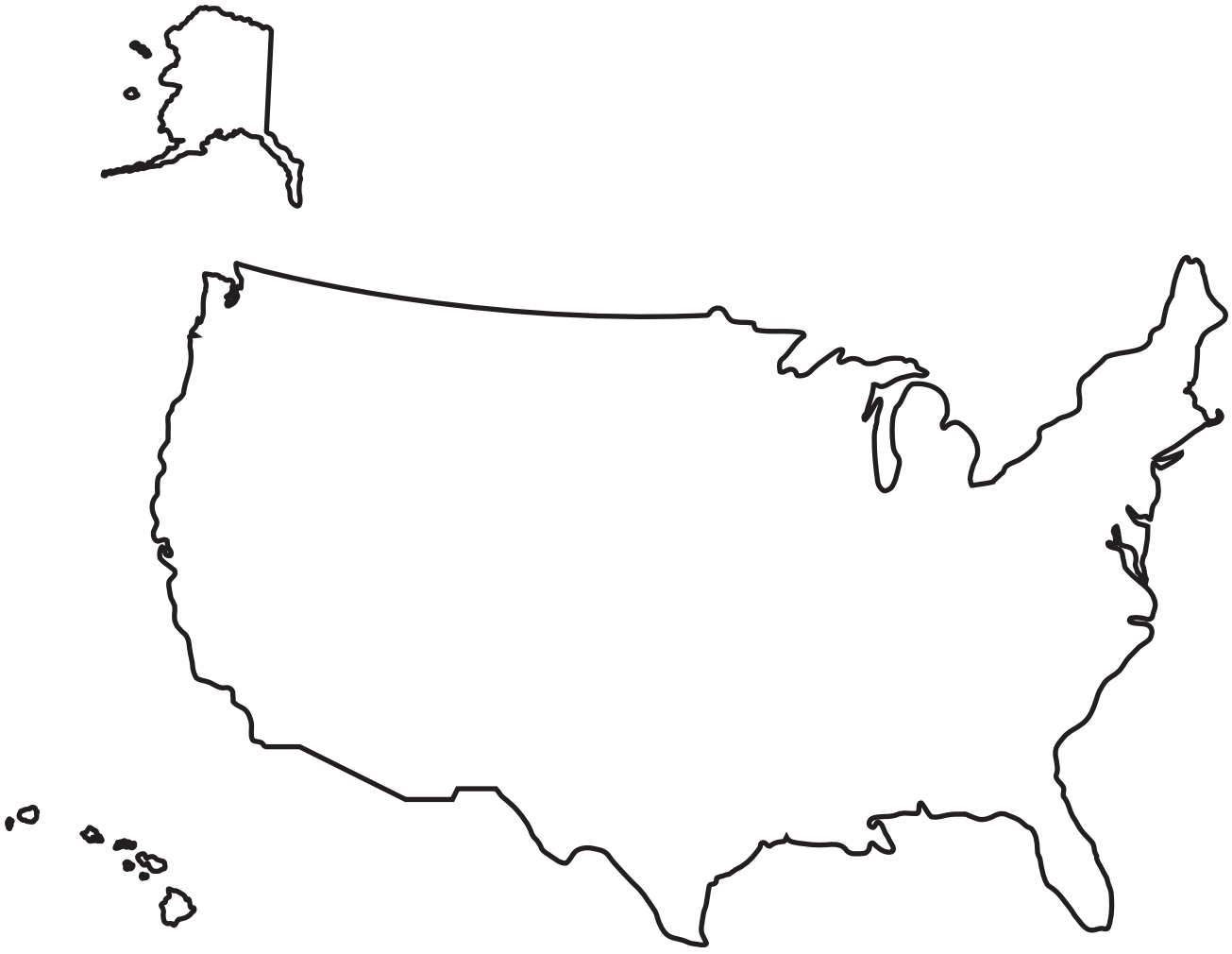
Reader 3: I know he'll find me soon. . . .

All: But how?

America: Wonderful Describing Words



In America



Written by _____

Mini Hundreds Charts

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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Mini Hundreds Charts

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
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91	92	93	94	95	96	97	98	99	100

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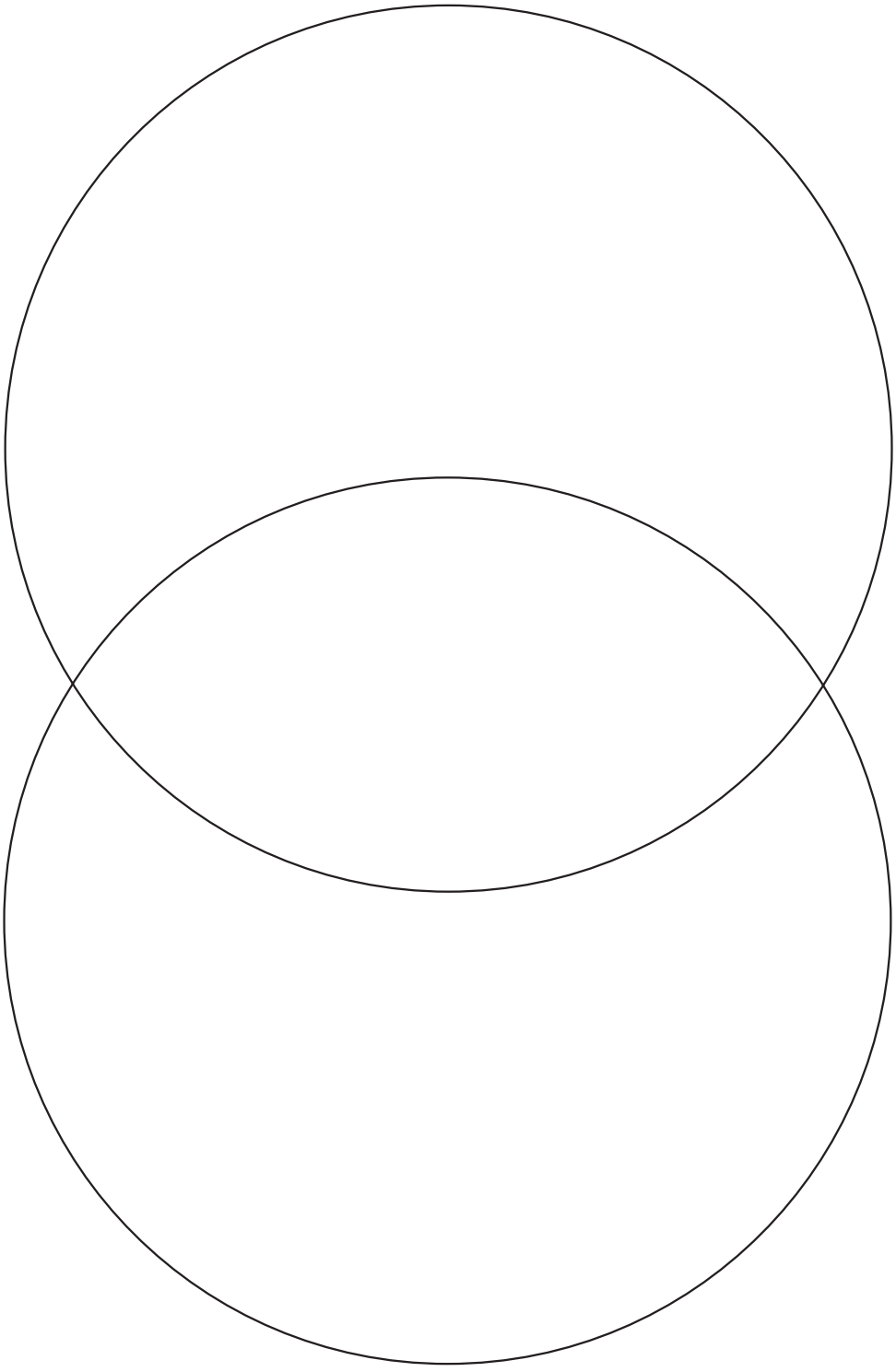
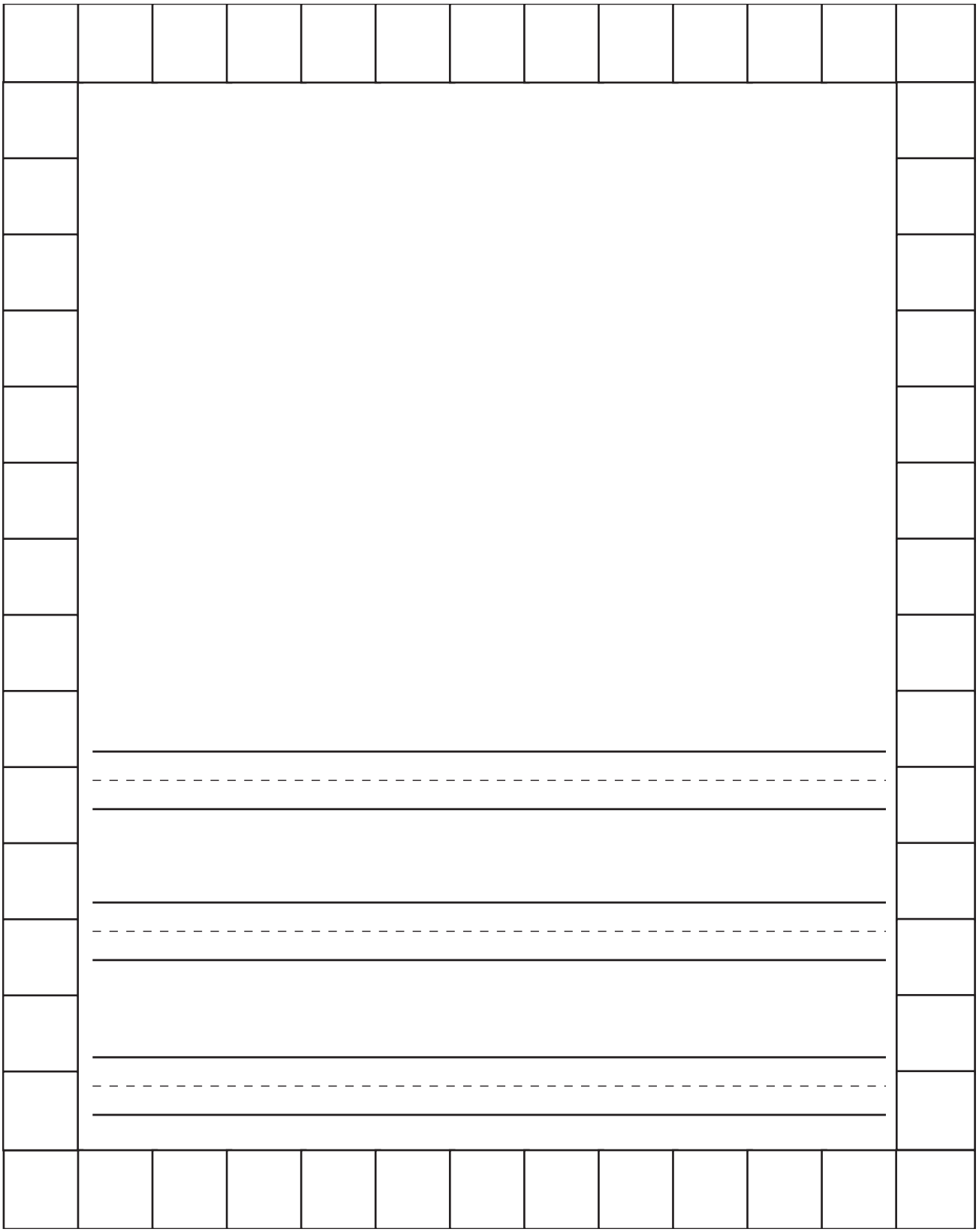
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Venn Diagram



Patterns at Home



Name _____

Code Letter

Pattern Trains (10 square)

1

2

3

4

5

6

7

8

Name _____

Recording Sheet

Name _____

Recording Sheet

Name _____

Pattern Paths Recording Sheet

1

2

3

4

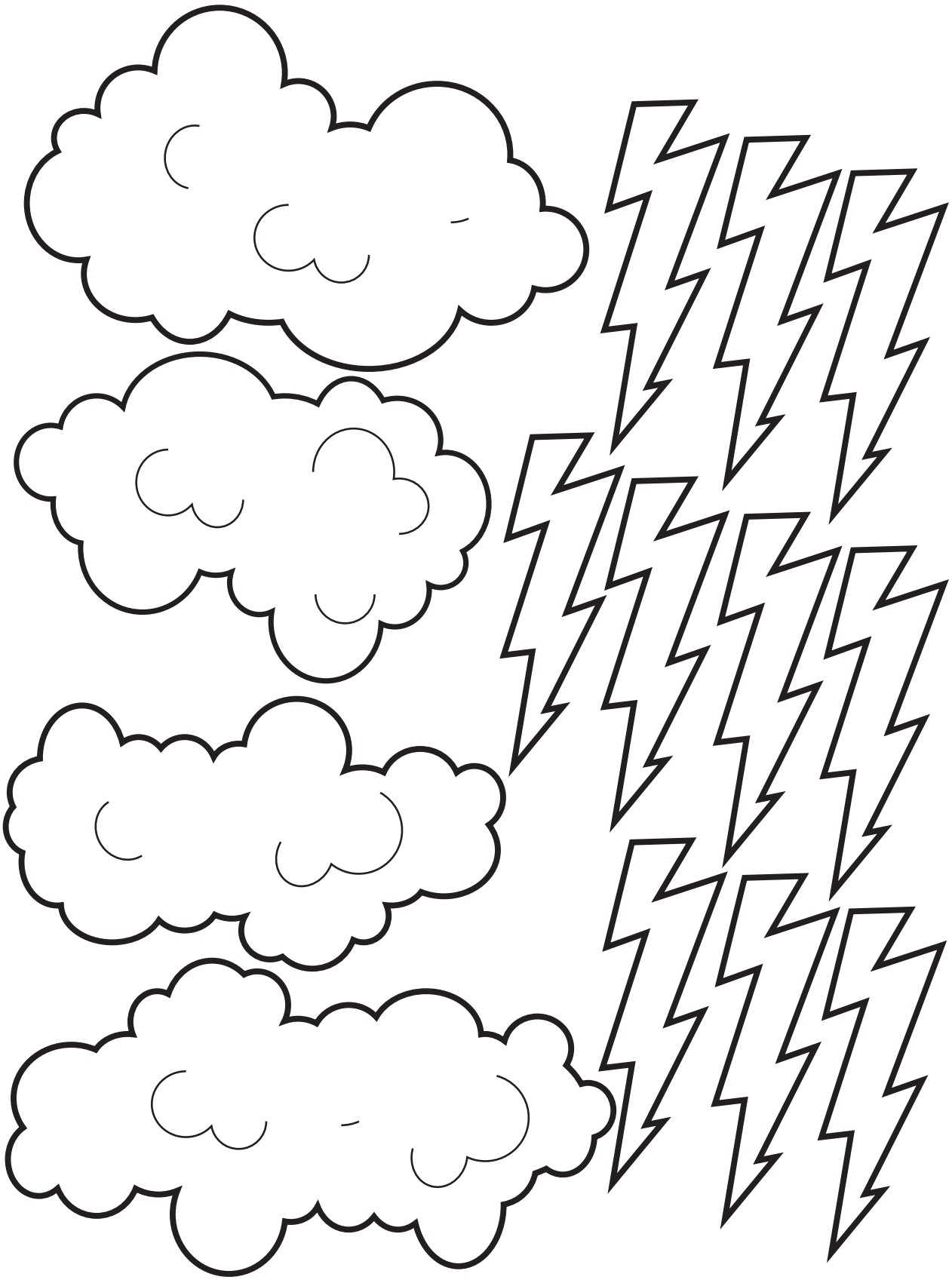
5

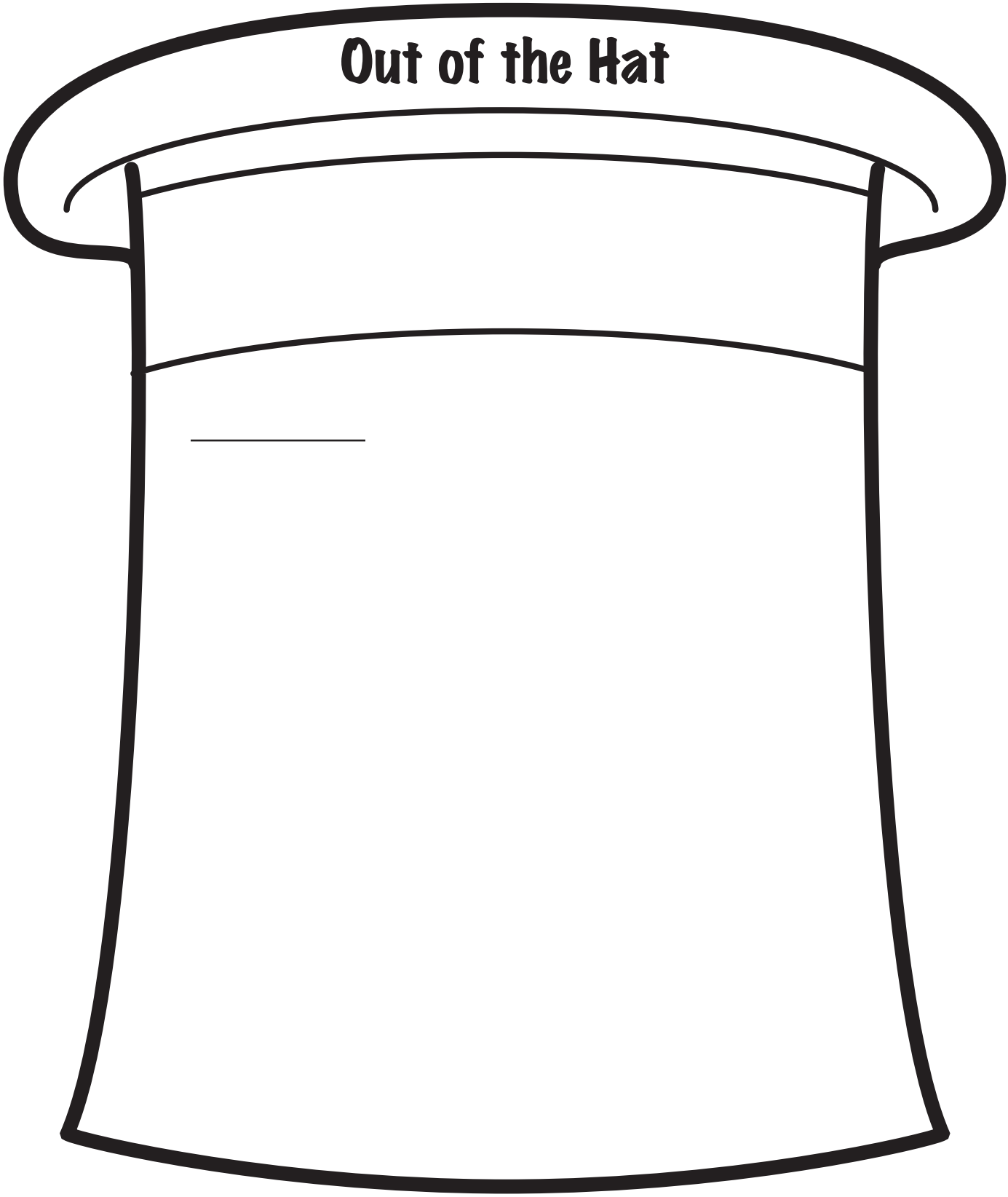
6

7

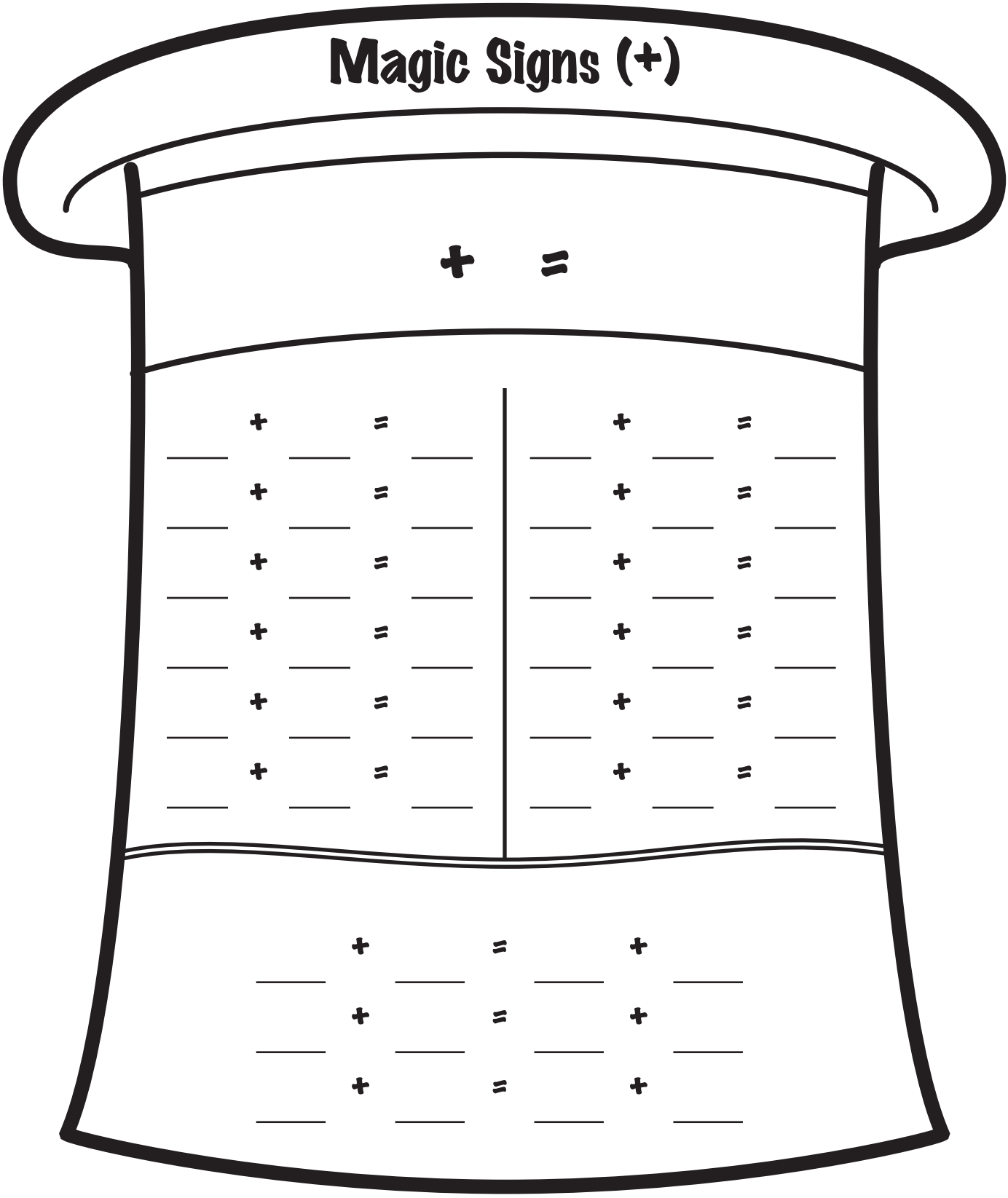
8

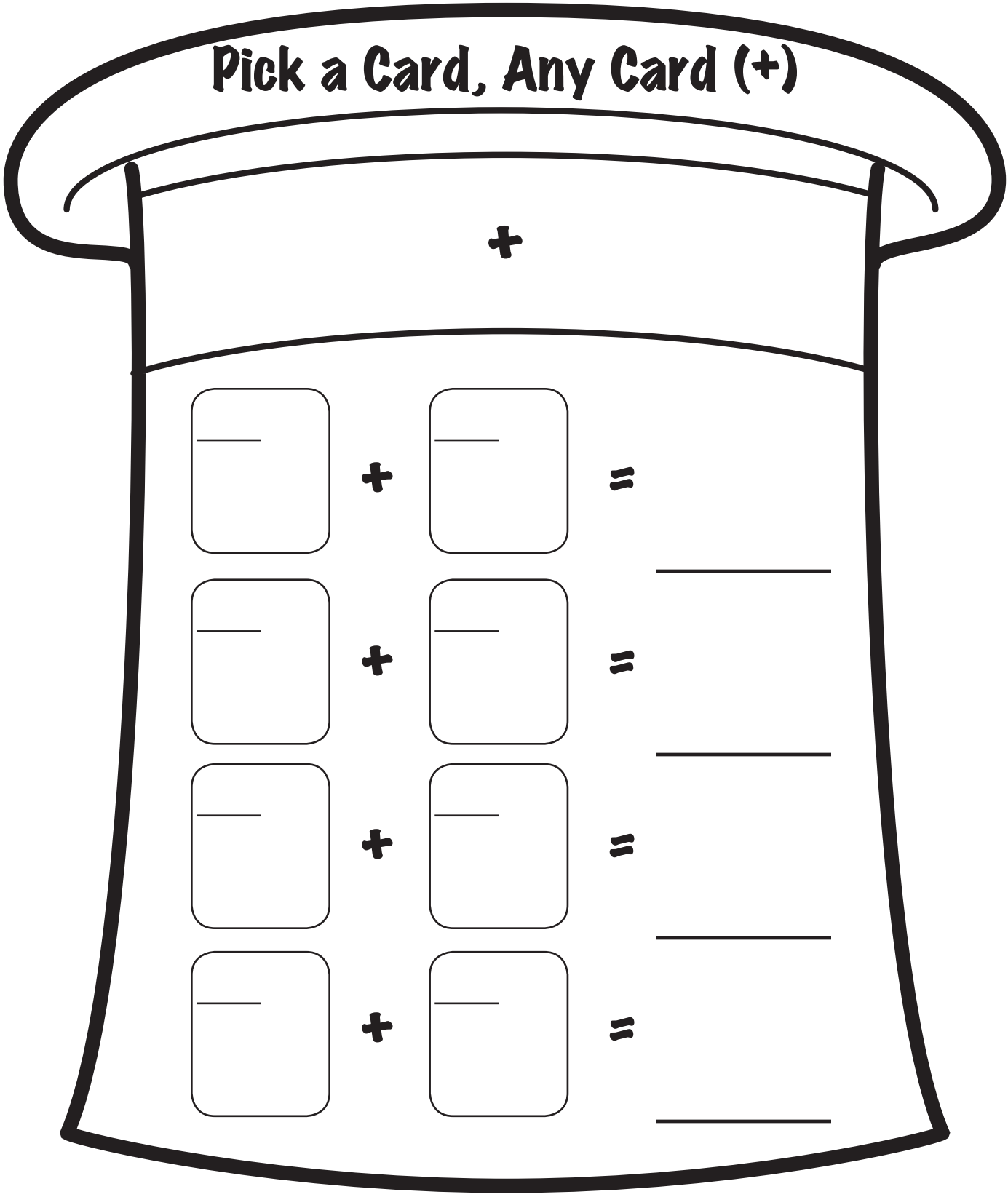
Pattern Rain Cloud Shapes




Out of the Hat

Magic Signs (+)




Pick a Card, Any Card (+)
+
+
=
+
=
+
=
+
=

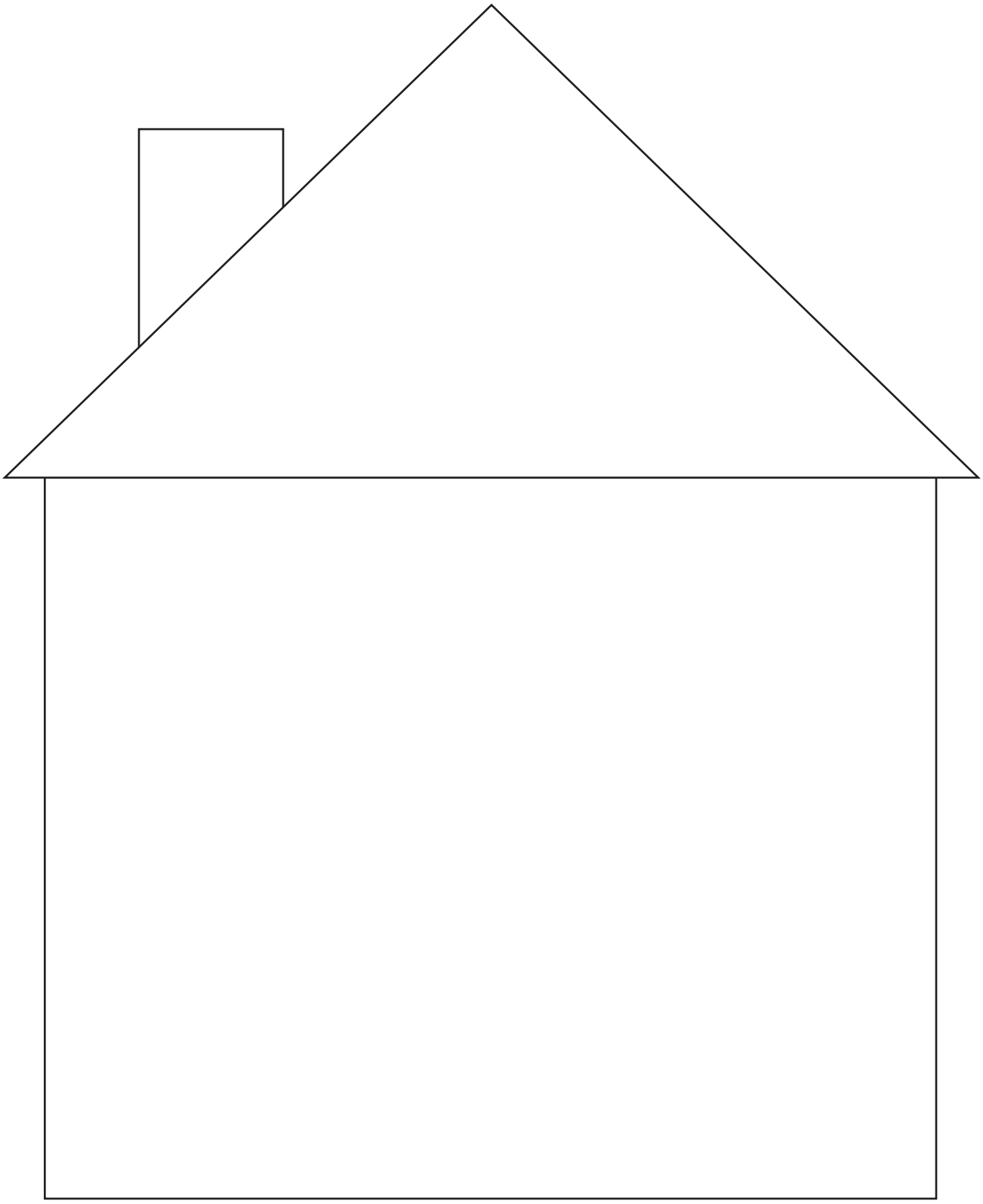
My Family

There are _____ people in my family.

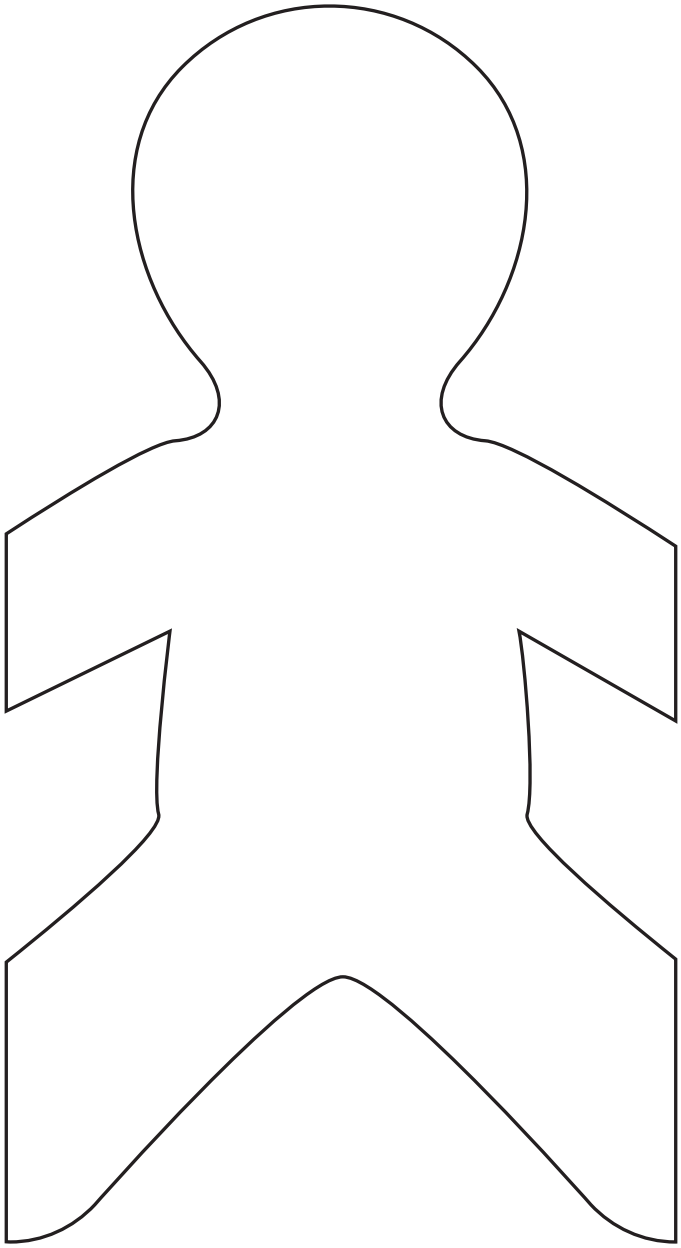
_____ boys

_____ girls

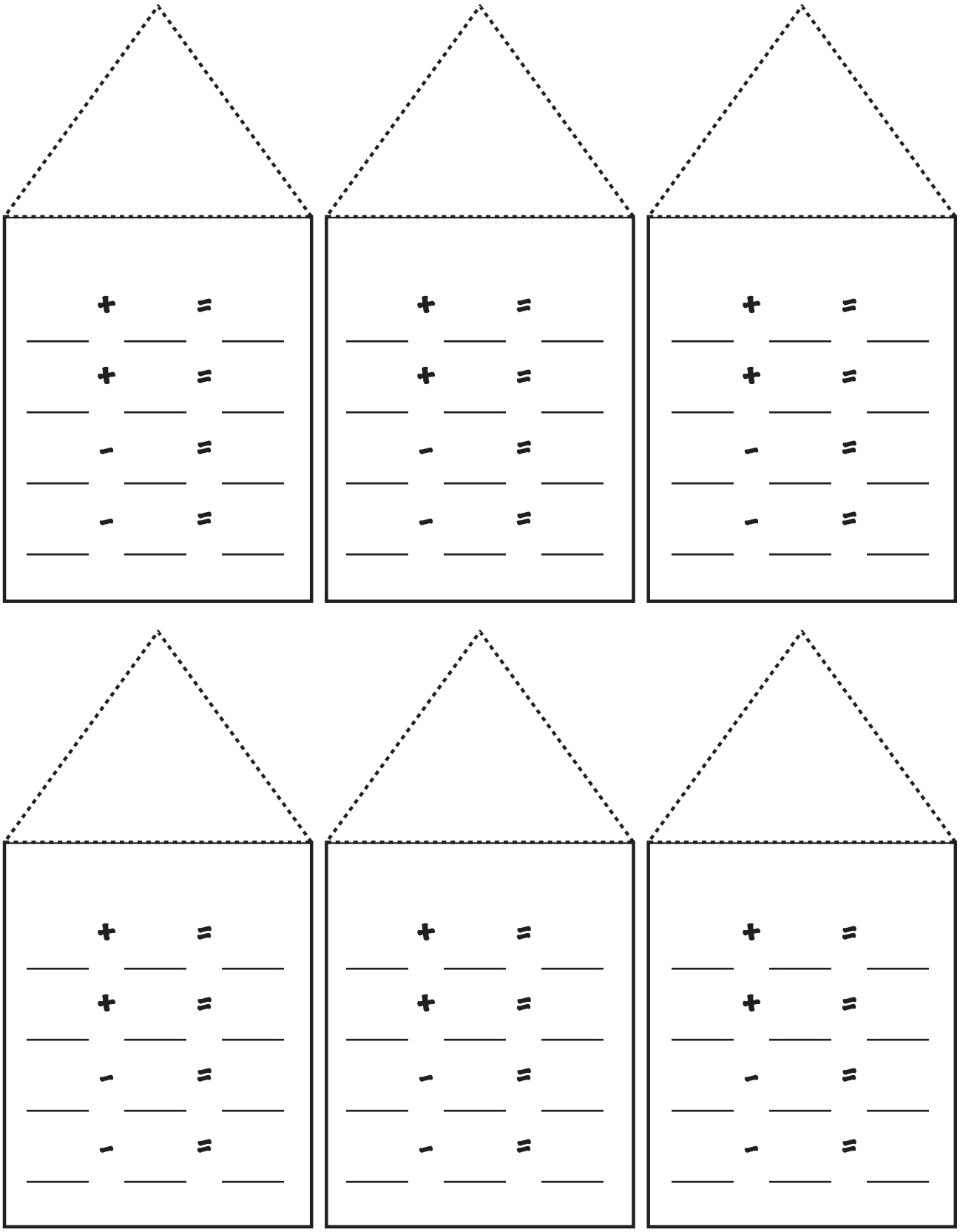
House of....



Family Chain Pattern



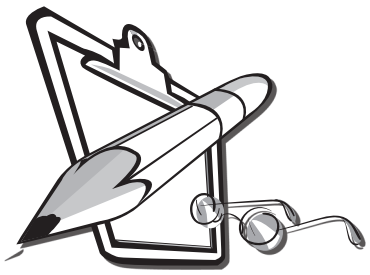
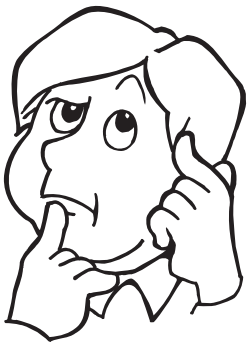
Fact Family Triangles



Water Alpha-Box	A	B
C	D	E
F	G	H
I	J	K
L	M	N
O	P	Q
R	S	T
U	V	W
X	Y	Z

Scientific Method

1.  Question	
2.  Hypothesis	
3.  Experiment	

4.  **Write & Draw Observations**	
5.  **Conclusions**	
6.  **Share & Discuss**	

Hundreds Board

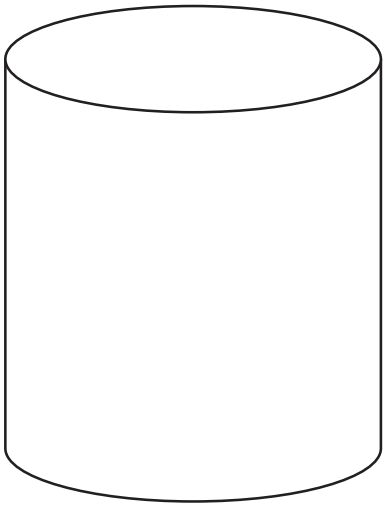
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Name _____

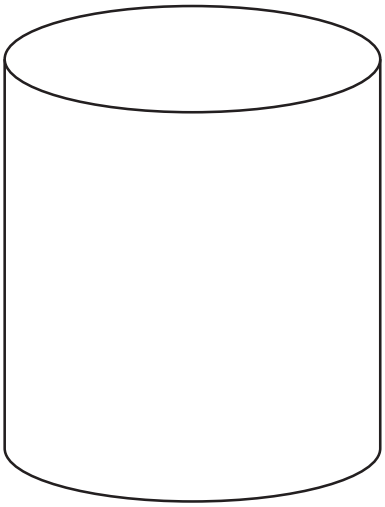
In the Can

Choose two containers. Draw the objects in each container and write the can number. Write greater than, less than, or equal two under each set of cans.

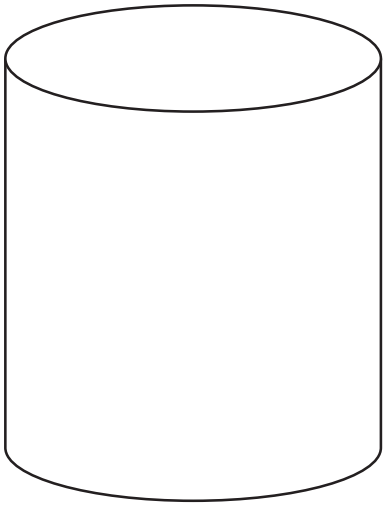
Can Number



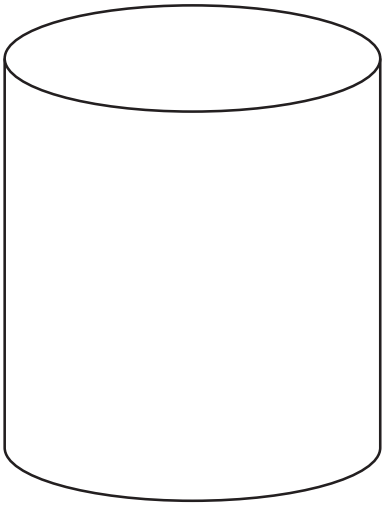
Can Number



Can Number



Can Number



Word Bank	Greater Than	Less Than	Equal To